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# MODERN METALS

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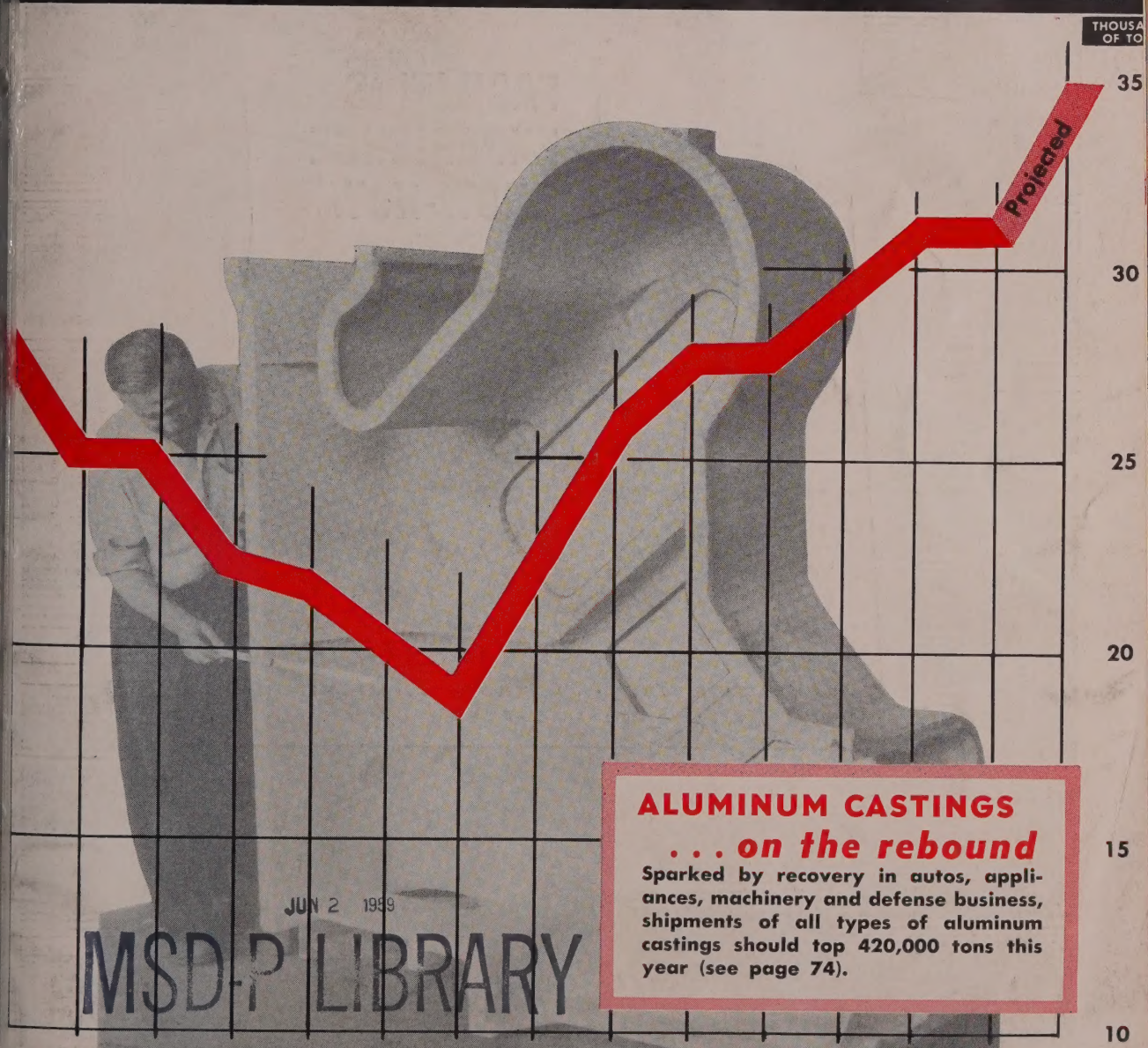


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## ALUMINUM CASTINGS
## . . . on the rebound

**Sparked by recovery in autos, appliances, machinery and defense business, shipments of all types of aluminum castings should top 420,000 tons this year (see page 74).**

FIRST
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Extrusion
Tool
FACILITIES
EXPERIENCE
KNOW-HOW
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## there's enough "EXTRA" here to give you an EDGE

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*QUALITY CAN PUT YOU AHEAD OF COMPETITION*

Many a Scovill customer has said to us, in effect, "We're doing so well with Scovill Mill Products that it's giving us a nice little 'edge' on the competition. Don't tell our competitors". But that kind of "secret" cannot be kept for long, and it's a fact that more and more fabricators are following up the smart lead and switching to a higher standard of quality in Scovill Brass • Copper • Aluminum. They're finding that Scovill's deliberately planned program of constant improvement in mill production equipment and methods pays off in results on the fabricator's own production line.

You can buy Brass • Copper • Aluminum Mill products from many sources . . . BUT Scovill fabricator-oriented services are available only from . . . the source of Mill Products bearing this Trademark.

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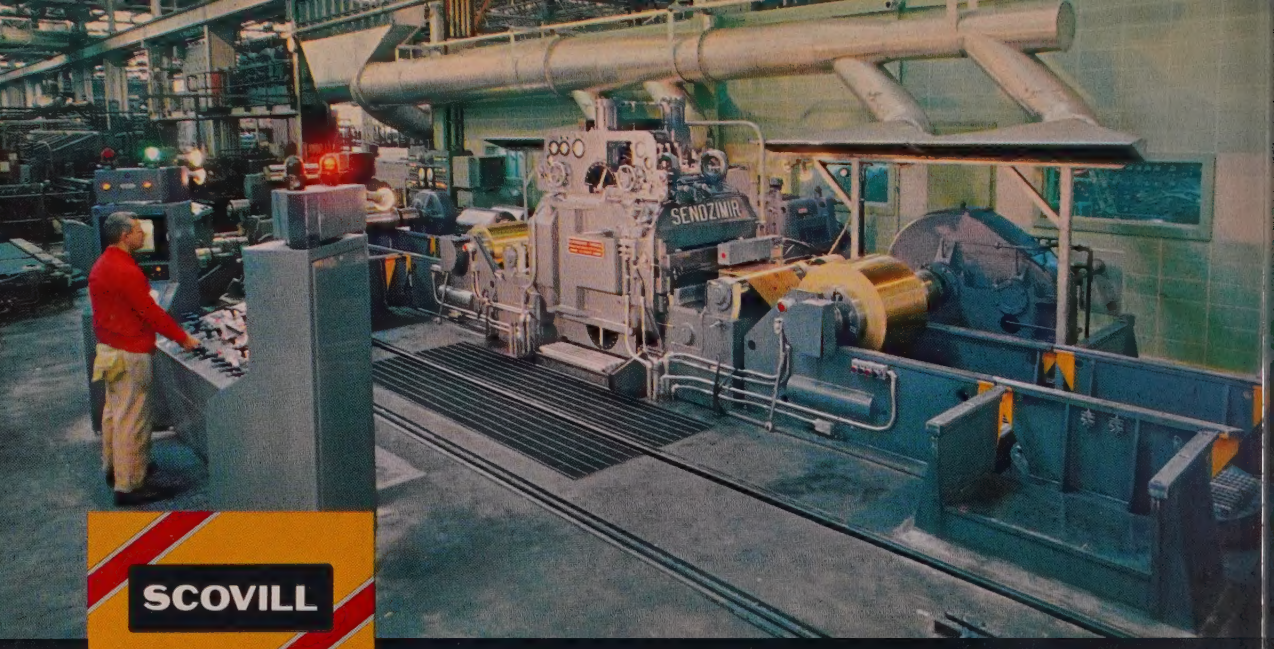


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offers a new "EXTRA" in quality and uniformity

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Here is the last word in rolling mill equipment and coordinated precision controls for production of brass strip and aluminum sheet to far closer dimensional tolerances and with far superior micro-inch finish than that available under previous commercial standards.

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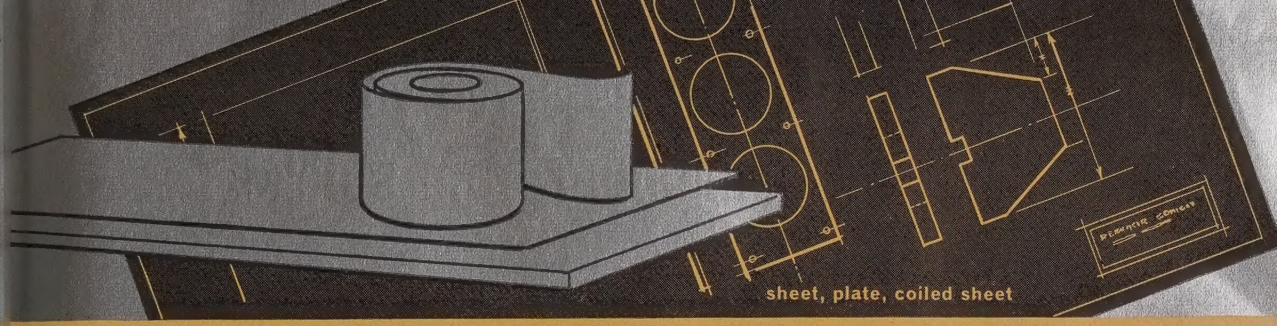


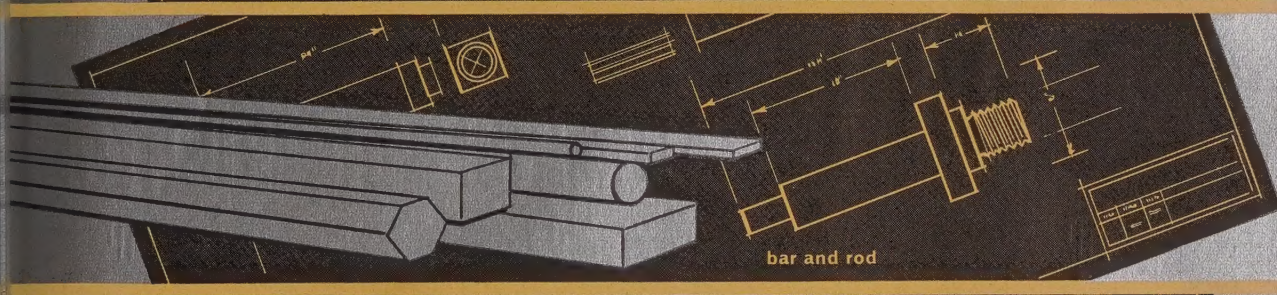


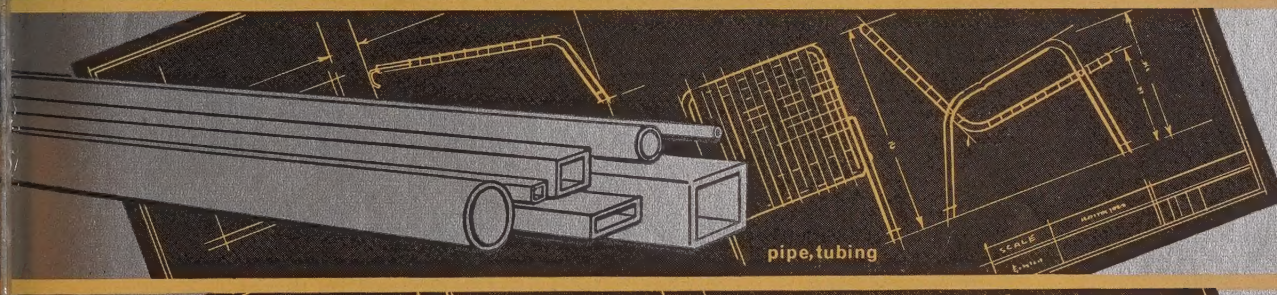


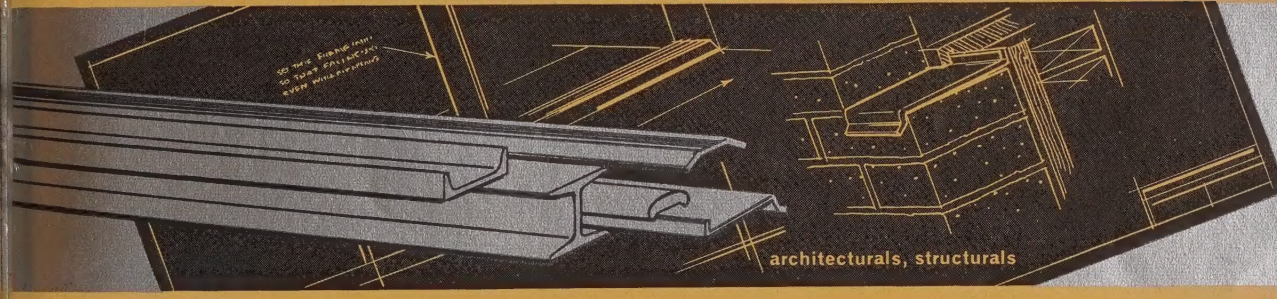


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Richmond 18, Virginia

*See next page*

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Industrial Metals, Inc., Wichita
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Peter A. Frasse & Co., Philadelphia
Merchant & Evans Co., *Philadelphia
Morgan Aluminum-Welding Wire Co., Mt. Carmel, Pa. (Welding Wire)
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Reynolds Aluminum Supply Co., Memphis and Nashville
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Superior Sales Company, *Fort Worth
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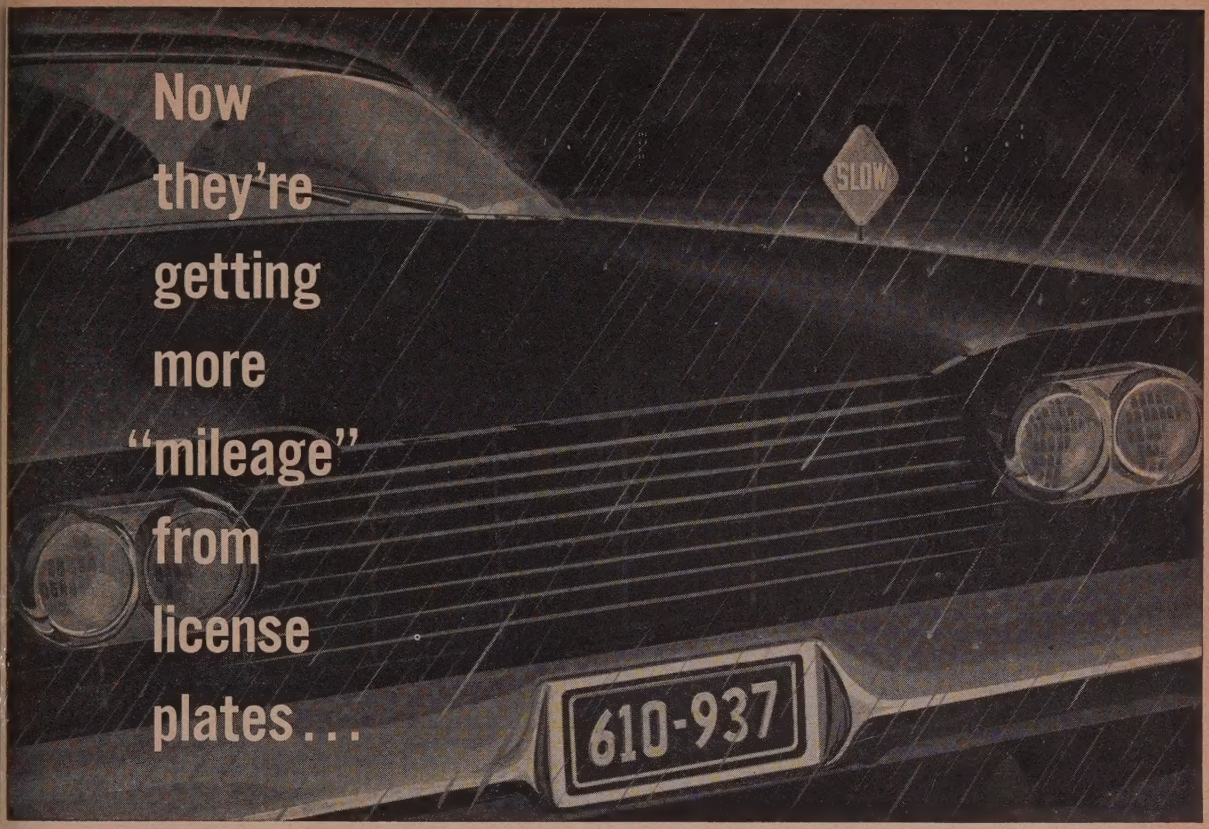


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Increased use of the five year aluminum license plate makes it vitally important that the metal retain its durability and wearing qualities under severe conditions of highway usage.

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**States now specifying Amchem Alodine for protective treatment of license plates, traffic signs, highway markers, etc.**

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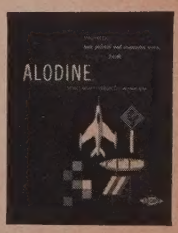
| MISSISSIPPI | VIRGINIA |
| MISSOURI | WISCONSIN |
| NEBRASKA | MONTANA |
| NEW HAMPSHIRE | OREGON |

*Write for Bulletin 1424A describing specific applications of Amchem Alodine. Contains handy selection chart to help you choose the Alodine type suited to your needs.*

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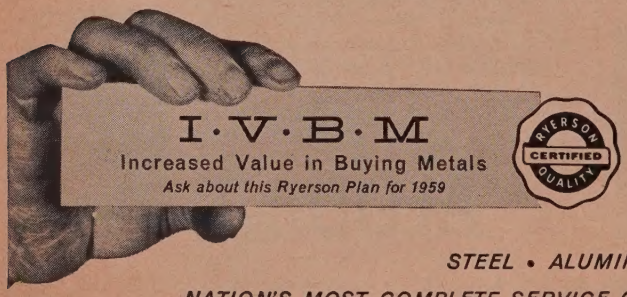
For the aluminum you need—delivered exactly when you want it, contact your Ryerson representative.

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**MODERN METALS**

Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

ON THE COVER: After hitting a low of less than 20,000 tons last July, aluminum castings shipments (all types) have been coming back strong ever since; could easily top 420,000 tons for the year. The graph on the cover is based on U. S. Commerce Department reports, except that we projected the figure for March '59. That big aluminum casting in the background is a military project by Quality Aluminum Casting Co. For a report on the Engineered Castings Show held in Chicago last month, see page 74.

•

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# Modern Metals

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Why is **Atlantic the largest** independent distributor of **Aluminum Brass, Copper?**

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# Letters

### WANTS GARAGE DOOR MANUFACTURER

Sirs:

We are national representatives for the past 15 years in the overhead garage door business.

At this time we are looking for a manufacturer to make a complete line of residential and commercial sections for garage doors, to fit our hardware—extruded aluminum.

The writer has already tested this type of design for garage doors, and we feel there is a tremendous market for them particularly with our well-established accounts.

We are wondering if you know of a manufacturer large enough and capable of making these sections for us. . .

"R"—N.Y.

**MM—Doubtless, there are plenty of firms around that are more than anxious to quote on your requirements. We'll be glad to forward all replies to "R" of New York.**

### WALKING BEAMS AND COOLING RACKS

Sirs:

Please forward any information you have on walking beams or automatic cooling racks.

We are also interested in any automatic pulling device of which you may have information.

"W"—Mich.

**MM—One firm that is active in making this equipment for extruders is Clark Automation Equipment Co., 419 W. Main St., Belding, Mich. (See Clark's ad in this issue.) They should be able to help you.**

### CHEMICAL MILLING

Sirs:

We would like to obtain a copy of an article entitled "Design for Chemical Milling" by Jay Sullivan, which appeared in Modern Metals, April 1958. If no reprints are available, please let us know where we may purchase a back issue of the magazine.

"G"—N.Y.

**MM—We have sent you tear sheets of the article.**

### COATING THICKNESS TESTER

Sirs:

1) Your release indicates that the thickness tester "measures, in a matter of *two minutes*" . . .

Actually, the Dermitron Tester measures, in a matter of two seconds, the thickness of various coatings such as paint and anodizing. One of the main features of the Dermitron is its ability to make rapid readings in a matter of seconds, and your statement that it takes two minutes to take a reading is rather misleading.

2) Your release states that "a Right-Angle Probe permits, for the first time, non-destructive measurements . . . on inside diameters . . . down to ½" I.D." Now the photo above the release does not show the Right-Angle probe, but shows the Standard Probe in use.

Let me point out that we would rather stress the ability of the Dermitron Thickness Tester to measure the thickness of paint, anodizing and other coatings on all kinds of sheets and other surfaces rather than emphasizing its ability to "measure inside pipe". . .

"S"—N.Y.

**MM—This refers to a news item on a coat-**

**COLOR** *Anodizing*

**Aluminum parts, shapes, stampings, castings—all sizes up to 16-ft. lengths—now color anodized on fully automatic equipment. Volume pick-up and delivery throughout Central and Eastern United States.**

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**Next time...this time... whenever you need aluminum... call Jorgensen first!**

**EARLE M. JORGENSEN CO.**

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ing thickness tester that appeared in March and is manufactured by Unit Process Assemblies, Inc., 61 East 4th St., N. Y. City.

Our editing of the information submitted left something to be desired, and we are glad to correct the errors.

### SOURCE FOR HARDWARE FOR ALUMINUM

Sirs:

In your February issue we note several requests for information in connection with hardware manufacturers.

We wish to advise that we have manufactured and furnished hardware to the railroads for their passenger cars for the last 100 years, and we have also manufactured marine hardware.

It is possible that we could help some of these people who are requesting information seeking hardware manufacturers, and if it would be possible for us to secure the names and addresses of the people who are requesting this information, we we would certainly appreciate it.

"J"—Ind.

**MM—We have sent you the names of the requesters. For others seeking aluminum hardware manufacturers, contact:**

**Adams & Westlake Co.**
**Elkhart, Ind.**
**or**
**Lake Park Tool & Die**
**1221 Velma Court**
**Youngstown, Ohio**

### THE BARONI BRIDGE

Sirs:

. . .You fellows really stick your neck out by avoiding some of the facts which cause the public and your readers to be completely misled.

You didn't mention that the Baroni Bridge (January '59) has twice failed its test at New York University, whereas the Fairchild-Aluminum Bridge has passed every test given to it by Lehigh University and others. The many people you excite about the bridge may only be due for a letdown unless you make these points clear. . .

"L"—N.Y.

**MM—Reynolds Metals' reply:**

**". . . You refer to two failures. Actually these were both the same situation—stress concentration cracks which originated from a few of the bolt holes in the area of maximum tension. The cracks developed after tests comparable to 35-40 years' service. The holes were repaired and testing resumed, and the cracks appeared again. Since this was a design detail and not a problem of overall design, the design detail was changed.**

**"An alternative design which eliminates the bolt holes has now been prepared. Because of special extrusion alloys and dies required, it is taking a little while to produce the new components. . .**

**"Another possible design change indicated by the tests is that the baffles between the parallel arches can be made of lighter gauge sheet. Test instruments have shown that the baffles actually are subjected to somewhat smaller stresses than calculated, and thus, some weight saving can be effected here without loss to the carrying capacities of the bridge.**

**"The purpose of these exhaustive tests is to determine the efficiency of all parts in carrying out their design function. To accomplish this, test loads for exceeding design specifications have been placed on the bridge to simulate service loads much above any anticipated. These load cycles are being imposed to simulate 100 years of service."**

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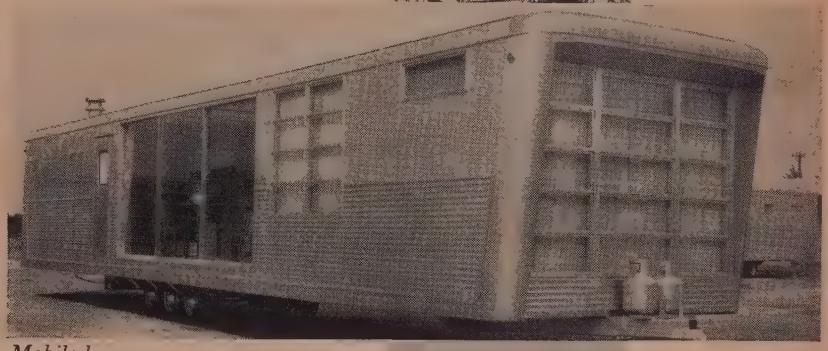
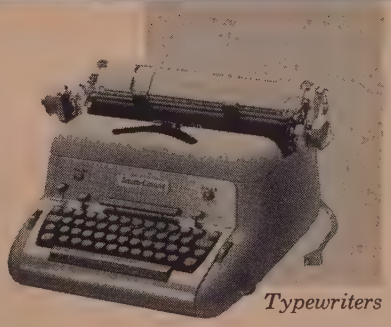


*Mobile homes*



*Typewriters*

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# Here and There

**Gray Iron, Good-by?** » » Whether unwittingly or by design, the automakers — GM, particularly — are creating much suspense in the primary aluminum industry and among aluminum fabricators who have a stake in increased aluminum consumption. Chevrolet has allocated parts work for its new "compact" car to various plants in New York State, and the Massena "hot metal" plant is supposed to start casting some time next month. The current mystery is whether the aluminum engine block will have gray iron or aluminum cylinder liners. Auto people believe GM will start out with gray iron; move to aluminum cylinders later on. Paradoxically, the one auto firm that hasn't formally announced its compact car (Chevvie) has leaked all kinds of information about it. Next to nothing is known about Ford and Chrysler, but it seems that Ford has elected to stay with gray iron for *its* block. Heartening news for the aluminum boys are GM's reported plans for lightweight (though hardly compact) Buick, Olds and Pontiac models, which evidently will have V-8 aluminum engines (note our veiled reference to this in the Foundry Show report on page 74.)

**The Die Casting Bonuses** » » Automakers' increasing use of aluminum in cars continues to be a popular promotion gambit for the aluminum industry. Example: Reynolds Metals' Mahlon Wood recently told an SAE meeting about an automatic transmission redesign program which takes advantage of the aluminum die casting approach. The original parts consisted of an assembly of one large iron casting and three aluminum die castings. Total rough weight of these parts was about 100 pounds, and the transfer price to the machining plant was $12 to $15. Using die cast aluminum, however, the new design will have two castings instead of four; rough weight will be 25 pounds instead of 100; and transfer price is estimated at under $10. So they lop off 75 pounds and reap a rough casting cost saving of $2 per transmission plus over $3 saved in machining and assembly. Reynolds believes that aluminum can also be used economically in engine blocks and heads, differential carriers, wheels, cast sub-frame structures, doors, hoods, deck lids and bumpers. These applications represent a total of 500 pounds of aluminum per car by 1980.

**What's Up Front That Counts** » » Speaking of bumpers, here is an application for the light metal that could greatly reduce front end weight, says E. P. White, Alcoa's automotive section manager. Aluminum's durability has been well established by its ten-year history in bumpers for Greyhound busses and other commercial vehicles. He points out that the great weight of current passenger models and their smaller wheels have caused concern over tire loading, steering effort, and engine horsepower requirements. Current steel front bumper designs weigh 50 to 150 pounds.

**Home on the Highway** » » Three-quarters of all mobile homes built in the U.S. will have exterior made of pre-painted aluminum sheet, according to R. D. Franks, general manager of Supreme-Victor Mobile

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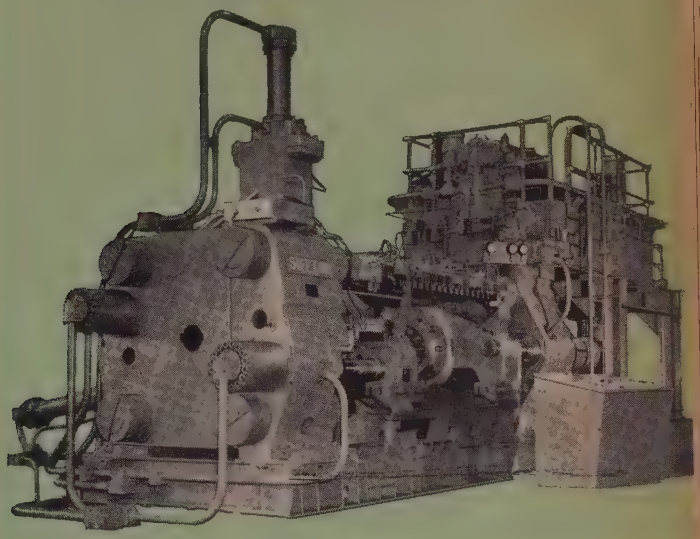
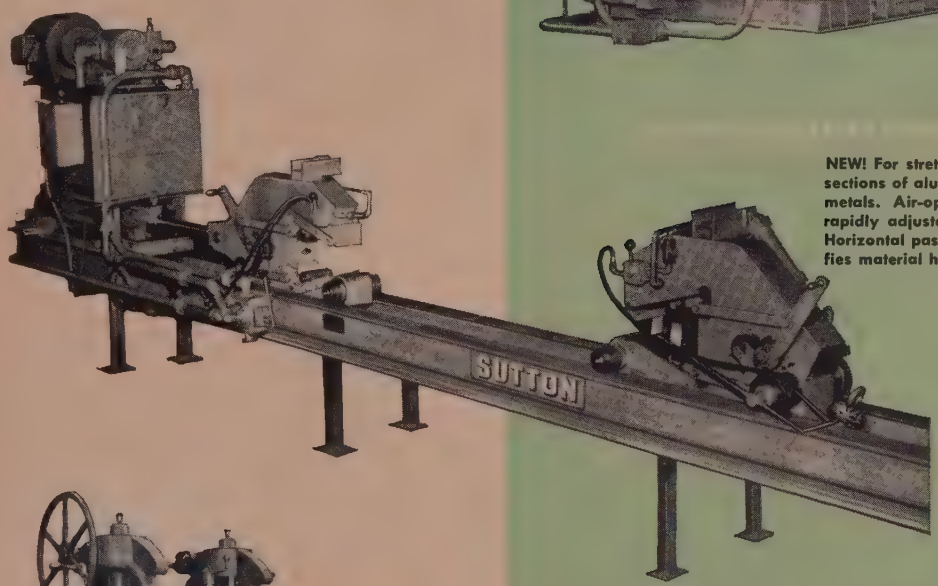
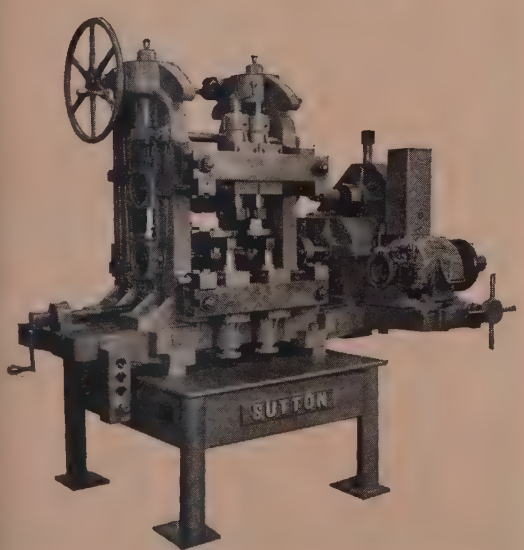
NEW! For high-speed production of aluminum shapes. Featured is a special electric-hydraulic system for entirely automatic cycling with solid, porthole or bridge-type dies.






NEW! For stretch-straightening extruded sections of aluminum and other modern metals. Air-operated jaws. Tail stock rapidly adjustable for different lengths. Horizontal pass line speeds and simplifies material handling.

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Homes. Franks, whose firm's plant in Bonham, Texas is said to be the largest of its type in the southwest, did not put a time limit on his prediction. But he did reveal that Supreme-Victor is switching from steel to Reynolds Colorweld Mobile Home Sheet "because we can now offer customers aluminum with the finest paint finish in the mobile home industry at a cost comparable to steel painted in our shop." He also pointed out that elimination of the painting department makes room for another assembly line, "thus achieving increased production at lower cost." These advantages, he declared, make pre-painted aluminum "the best material for exterior panels." All in all, it adds up to a natural application for pre-painted aluminum, and points up why this material is one of the aluminum industry's fastest growing mill products.

**Hot Stuff; Pure Stuff** » » Research activities at Alcoa have created a new refractory material — aluminum nitride — which is claimed to be the only material yet discovered that is not attacked by aluminum at extremely high temperatures. Seems that the stuff was developed for use in investigations of aluminum's behavior in the 3282°—3632°F range. No indication as to possible commercial applications, but the refractory has been used as a material for lab apparatus. And over at P. R. Mallory & Co., super-pure aluminum has been produced by zone refining and vacuum melting. The zone refining yields 99.99% pure aluminum, which is then vacuum melted to reduce metallic impurities to 1 to 3 parts per million, and carbon to under 5 ppm. Corrosion resistance of the super-pure stuff is markedly superior to that of plain old 99.99% aluminum.

**Those Clever Russians** » » Our undercover man in Kiev reports that hollow aluminum billets are rolled flat on a conventional sheet mill in that Russian city, then coiled in the normal manner and hauled off to wherever an aluminum pipeline is to be set up. Then they just inflate the tubing on site by pumping water into it. They make tubing up to 10 inches in diameter this way, our man contends, and they save a pile of rubles in shipping expense. Anybody care to give it a try in this country?

**Booming in Britain** » » Consumption of aluminum in Britain will grow by more than 100,000 tons by 1963, according to an all-out survey in the London *Times* late last month. Britain boasts the third largest aluminum fabricating industry — behind the U. S. and Russia — and has expanded its output five and a half times since 1938. Output of aluminum products totaled around 60,000 tons back then; and reached a high of over 330,000 tons last year. Aluminum's biggest market in Britain is the transportation industry, which consumed a hefty 80,000 tons in '58. Packaging —one of the fastest growing fields of use there as here— took some 20,000 tons (on page 40 of this issue you'll find a report on aluminum in packaging in the U.S.). Other major markets include: Industrial equipment (31,000 tons); domestic and office equipment (30,000 tons); electrical equipment (25,000 tons), and building and construction (20,000 tons). Strange that aluminum's

# to finished extrusions . . .

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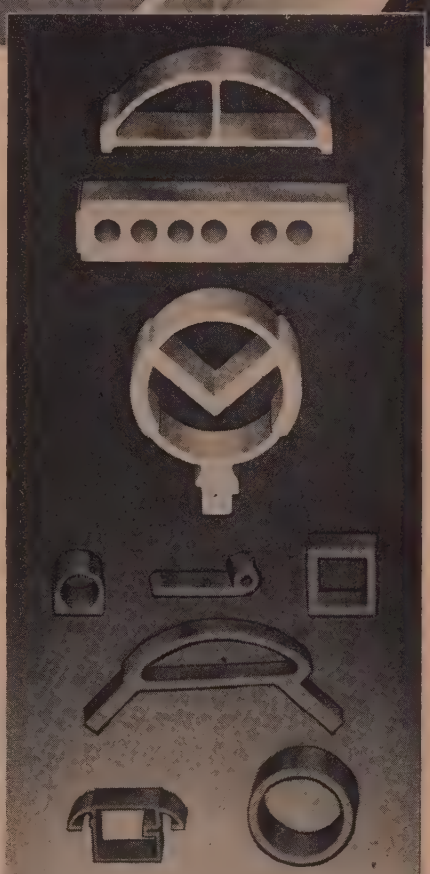

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largest market in the U. S. — Building and Construction — just an also-ran in England. We're gonna take a closer look at this report; maybe abstract it in a future issue.

**Now It's Delrin » »** Latest challenge to aluminum — and steel, brass and zinc as well — is Delrin, a new acetal resin developed by Du Pont. It's a tough, rigid thermoplastic developed for use in fields now dominated by die castings. Though very rigid, Delrin isn't brittle. It is tough and resilient, "much like spring steel," and retains these properties under adverse temperature and humidity. Though hefty compared with other plastics, it is lighter than any of the die casting alloys — even 20% lighter than magnesium. Markets are said to be components for autos, industrial machinery and plumbing, gears, bearings, bushings, door handles, window cranks, moving parts in clocks, cameras, home appliances, and so on. The price — 95c a pound for truckload quantities of natural color polymer — will come down as production increases, Du Pont promises. Delrin can be fabricated on standard plastics processing equipment.

**Fishyback—Without Boats » »** Word from England is that another version of the single-load, single-unload containerization idea is developing there. A hundred miles of narrow waterways in the industrial Midlands is plied by narrow, 25-ton cargo boats. Too often these carriers are uneconomical for certain types of bulk cargo. So, someone decided that aluminum containers would be used in the form of water trains. The big metal boxes (perhaps cylinders) would be loaded with the material at its production site, trucked to the canal's edge, dumped in the water and strung together by chain. Then, a tugboat would tow the string of cylinders to the nearest shore-point. Here, a crane would hoist each container out of the water onto a truck for delivery if the customer is inland. The prototypes were of wood, but production containers will be of aluminum to provide strength, the best payload-to-weight ratio, and corrosion resistance.

**What About Water Skis? » »** Between five and six million water ski enthusiasts will take to the nation's rivers, bays and lakes this summer, and the statisticians say it's one of the fastest growing outdoor pastimes. As recently as two years ago they figured there were between three and four million. Manufacturers are swarming into the business (there are in the neighborhood of 250 water ski manufacturers in California) and it looks as though considerably more skis will be made this year than the 2000-odd pairs reported sold in 1950. Report is that some ski lines are being made in a variety of plaid and other fancy patterns (formica overlays) and that the real afficionado is likely to have two pairs — one for "best." Offhand, we're uncertain as to aluminum's penetration of this growing sport, but it certainly would seem to bear investigation. After that, there's the matter of binding accessories—a natural for the die casters.

**Thought for Today—And Everyday » »** Ralph J. Kraut, president of the National Machine Tool Builders Association, adds his voice to the charge that the U. S. is pricing itself out of world markets. He was addressing a Westinghouse Electric-sponsored machine tool forum. He sees particular danger in the nation's wage rates which have "leaped almost twice as fast as the man-hours of output." Industry, labor and consumers must all share the blame, he said. "We've all been so complacent about inflation as an easy way out," he said. Kraut said that Labor has to stop trying to get more and more money for less and less work; the Government must get on a pay-as-you-go basis and cut taxes; the Government should adopt more realistic depreciation tax rates to encourage efficiency and the retirement of obsolescent machinery; and offset low foreign wage rates by high tariffs.

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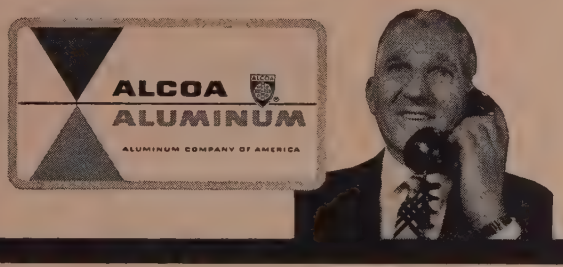


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# MARKET SURVEY

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## Alloy Enterprise

Aluminum alloy 5154 sheet and 6061-T6 structural members form the dump bodies of **dump trailers** made by Williamsen Body & Equipment Co., 9th and Wall Ave., Ogden, Utah.

Thermos **ice chests** are made with galvanized or aluminum interior in four sizes by The American Thermos Products Co., Norwich, Conn.

Magnetic catch for doors and screens has **aluminum case** with adjustable screw slots. Made by Penn-Akron Hardware Corp., Woodside 77, New York, N. Y.

Handy mason level contains two small levels in an **aluminum case** which straps to worker's wrist, indicates whether or not the wall is going up straight. Handy Mason Level Co., Inc., Box 365, Cudahy, Wisc., makes the device.

Tropic Breeze **wind machines** with extruded aluminum blades create breezes to protect fruit crops from frost. Operating at 590 rpm, fans are rotated through 360 degrees every 4½ minutes. The fans were developed by Alcoa and National Frost Protection Co., Inc., 2990 N. San Fernando Blvd., Burbank, Calif.

Storm King Corp., producer of aluminum building materials, has transferred its **extrusion operations** from Louisville, Ky., to a 65,000 sq. ft. plant in Miamisburg, Ohio, formerly occupied by Aeronca Mfg. Corp. West coast expansion will add fishing boats to Storm King lines.

Aluminum All-Weather **door saddle** attaches to doors to make them permanently weather-tight. Diamond Mfg. Corp., 66-84 74th St., Middle Village, N. Y., makes the extruded attachment.

A 50-piece line of solid wrought aluminum **furniture** in six chip- and crack-resistant colors is manufactured by Scroll, Inc., P.O. Box 877, Miami, Fla.

Gary Galok super rectangular mesh aluminum **grating** is made by Rockwell-Standard Corp., Grating Div., 4045 E. 7th Ave., Gary, Ind. Sizes include 3 ft. 4 in. by ⅛ in. to 2¼ in. by 3/16 inches.

Textron, Inc., Homelite Division, has bought rights to make the Fageol Marine Engine from Fageol Mfg. Co. of San Diego, Calif. At its Gastonia, N. C., plant the division will produce 50-hp **outboard motors** and both 50- and 100-hp inboard models.

**Cylinders** for holding silverware during storage and washing are made in aluminum by the Steril-Sil Co., 150 Causeway St., Boston 14, Mass. Holes permit water to drain or evaporate from the kitchen ware.

King Anodizing Co., Burbank, Calif., is exclusive Southern California contract applicator for the San-

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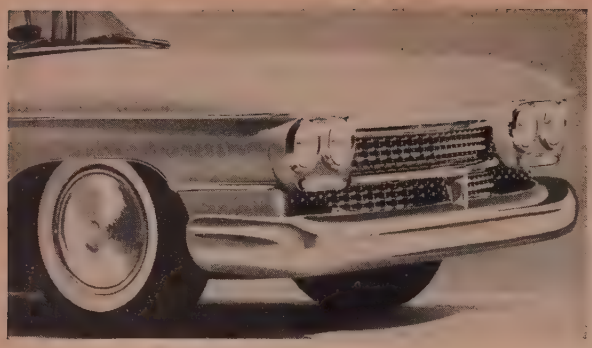

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fordize architectural and industrial aluminum **hard finishing process.** It's guaranteed on .001, or over, applied thickness to resist abrasion, corrosion, salt exposure and color change.

The newly formed Toledo Industrial Fabricating Co. has purchased the Industrial Fabricating Division of the Sam C. Earley Corp., 1465 Alexis Rd., Toledo, Ohio, aluminum welding and **fabricating company.**

A new independent **extrusion** operation gets under way next month in Connersville, Ind. Headed by Allan Benson and called Benson Aluminum Co., Inc., the plant is the first of its kind to be enclosed in a Butler building. Basic equipment will be Lanly furnaces and a Youngstown Foundry press.

Over half a ton more payload per trip than trucks made of heavier materials, and less maintenance are advantages offered by Airvan aluminum **truck bodies** produced by Dayton T. Brown, 1305 Strong Ave., Copiague, Long Island, N. Y. One piece, replaceable corner panels of heat-treated aluminum alloy absorb collision shock.

Aluminum fin and tube heating elements are part of a slim baseboard **heating unit** made by Dunham Bush, Inc., West Hartford, Conn. Components snap together for quick installation.

**Motor** for intermittent duty and mounting in restricted areas is made by Bodine Electric Co., 2254 W. Ohio St., Chicago 12, with die-cast aluminum housing. The 2-5/16-in. rectangular unit is series wound, self ventilated, 1/40 hp., 115-volt ac.-dc., with a nominal speed of 5,000 rpm.

Concealed **flashing** is made of aluminum, paper, glass and asphalt for drip caps, sill flashings, roof and side wall junctures. Made by Chase Brass & Copper Co., 236 Grand, Waterbury 20, Conn., Alum-O-Top comes in standard 2 and 4 mil grades with paper backing on one or both sides.

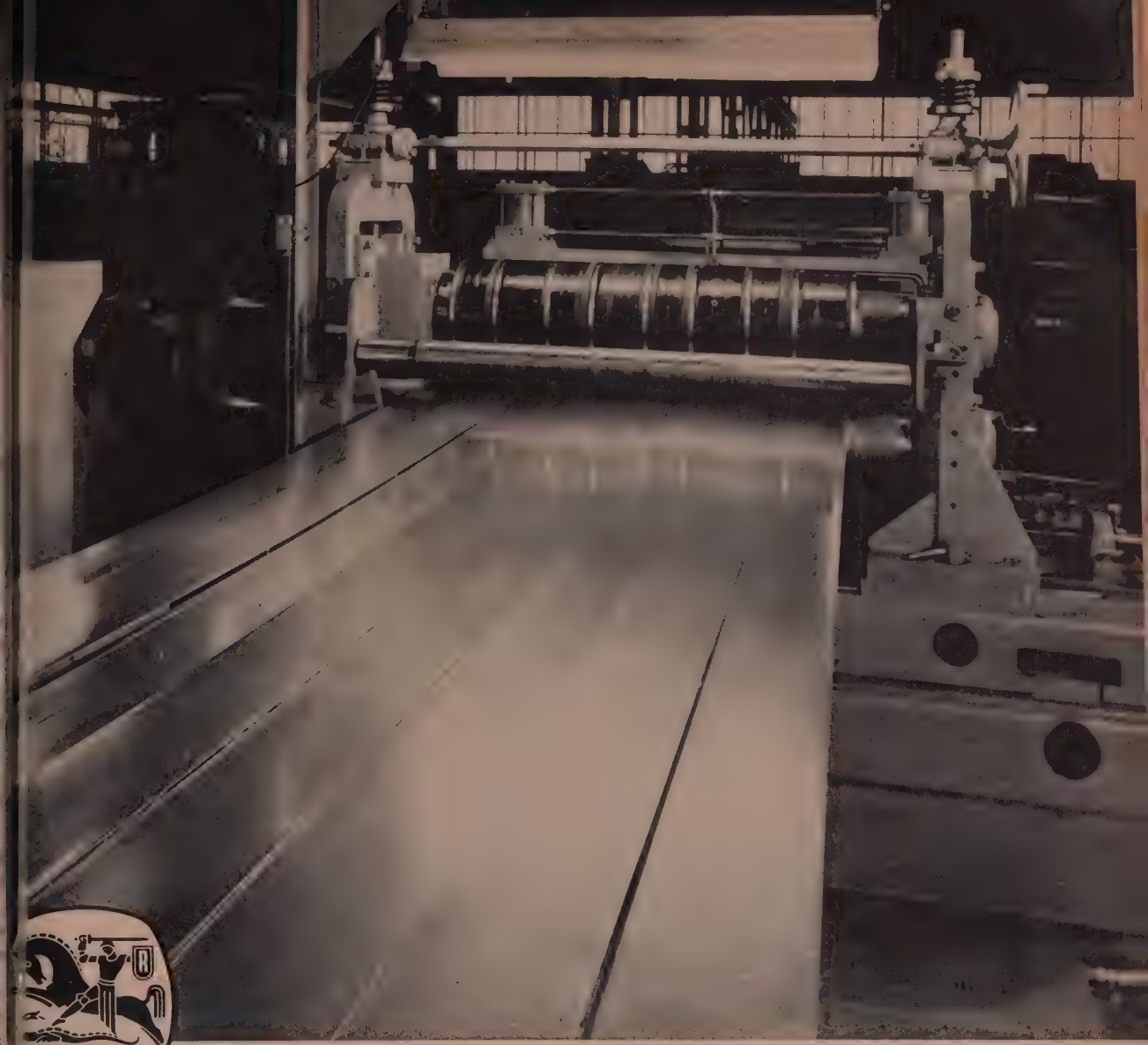
Aluminum **furniture legs** are supplied by Trend Industries, 2041 W. North Ave., Chicago 47. Square 1-in. leg screws in, comes in lengths from 3 to 16 inches. Tapered shape is made in lengths from 4 to 20 inches.

Wide base demountable wheels for high speed industrial applications have 3.50 x 6 tires and tubes and feature an aluminum **hub assembly** with dual size Timken bearings. Hub length is 3 inches. Manufacturer is Gar-Bro Wheel Co., 2415 E. Washington Blvd., Los Angeles 21.

Brisk Metal Products has a new plant at 39-18 Thirtieth St., Long Island City, N. Y. for conversion of extruded aluminum and other components into louvers, solar canopies, and vent housings. Plant manager is Lou Sommerfeld, veteran designer of **extruded aluminum louvers.**

Saltwater-resistant aluminum hardware anodized in blue, red or black is used on adjustable vinyl **water ski bindings** made by Ron-Vik, Inc., 1330 Quincy St., N.E., Minneapolis 13, Minn.

Powder filling machine for laboratory and limited



Typical aluminum slitting operation at a J & L Steel Warehouse.

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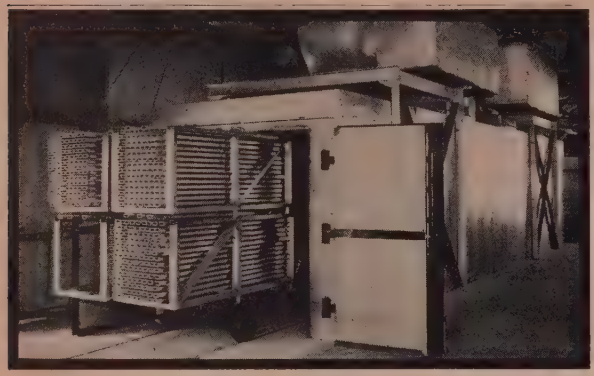

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This truck type oven is now in service at Penn Extrusion Corporation, Erie, Pa. Close temperature control is maintained through the use of two gas fired, recirculating air heating systems. Other Carl Mayer design features assure trouble-free, economical operation. Write for Bulletin HT-53.

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production service is made with aluminum **cylinder can and cabinet** by Perry Industries, 6401 Third Ave., Brooklyn 20, N. Y.

The Fieldmaster 22 caliber **rifle** made by Remington Arms Co., Inc., Bridgeport, Conn., weighs only 4 pounds. Receiver, trigger guard, butt plate and jacket are aluminum in tan, black or blue. "Finishes are virtually scratchproof and require no special care," the company reports.

Saucy Products Co., Waco, Tex., market their "Saucy Chick" frozen whole barbecued chicken in standard 8 x 8 x 2 in. Ekco-Alcoa aluminum **foil trays.**

Miniature **noise muffler** for air-operated devices is enclosed in polyether foam in an anodized aluminum case for mounting to exhaust ports. Three models are made for mounting to 1/8, 1/4 and 3/8-in. exhaust ports.

Camera **tripods** featuring heavy-duty positive-locking anodized aluminum tubular legs and crank-operated "extendo" mechanism of aluminum tube for minute adjustments, are made by Pagliuso Engineering Co., 113 West Harvard, Glendale 4, Calif.

The Flexcore expanding-type **contact grinding wheel** has been redesigned to include extruded aluminum core for light weight. Nu-Matic Grinders Inc., 8224 Carnegie Ave., Cleveland 3, O., makes them in widths up to 8 inches. Individual rubber flex units slipped into slots in the core hold abrasive grinding bands in place.

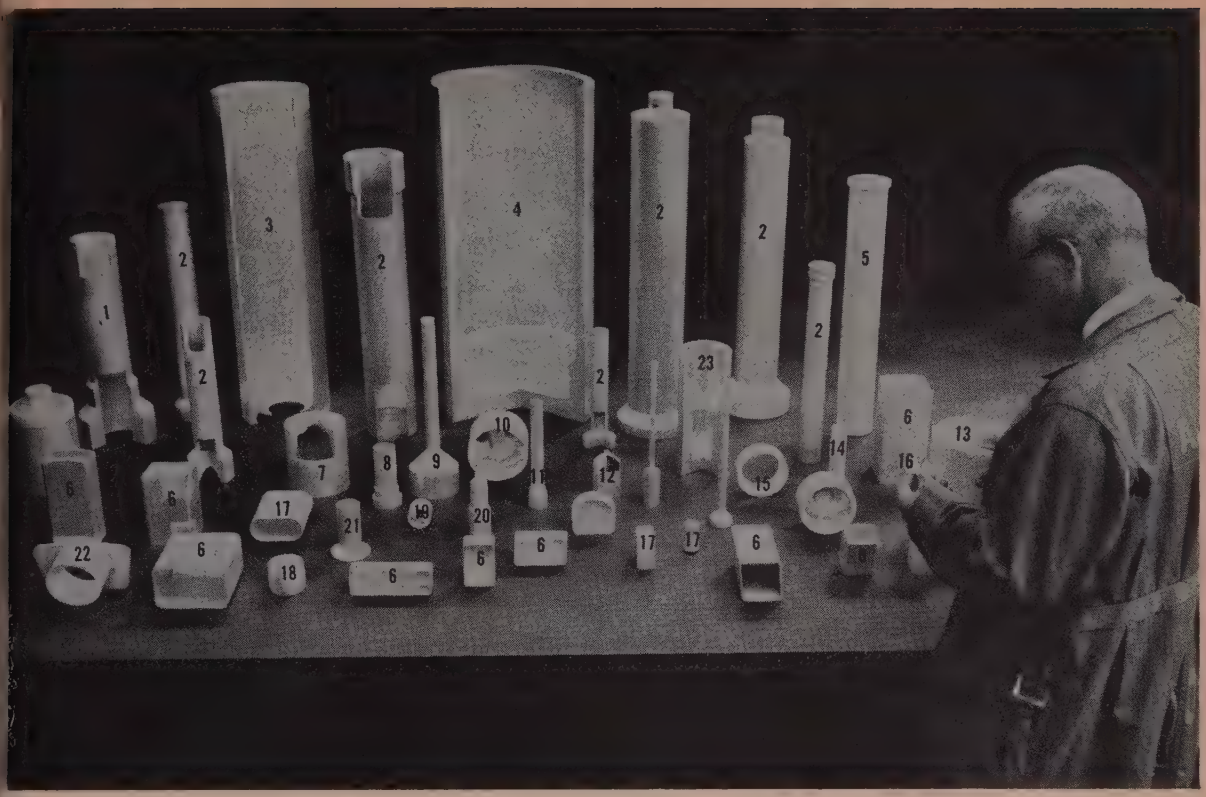
Model CE-800 **electric counter** with 200 million count life, full wave rectification for ac. operation, and a dustproof die cast aluminum enclosure is made by Production Instruments, 8064 McCormick Blvd., Skokie, Ill. Unit's dimensions are 5 5/8 x 3 1/8 x 4 3/4 inches.

The Airequipt Electro-Changer, made of aluminum, fits standard colored slide projectors, **changes slides automatically** at various speeds, by remote control or push button. The changer is electrically operated with controls to change or hold slides as desired. Manufacturer is Airequipt Mfg. Co., 20 Jones St., New Rochelle, N. Y.

Instant radiant heat is supplied by ceiling-mounted electric bathroom heater from nickel chrome heating coil, supported by ceramic bushings and mounted below a polished **aluminum reflector.** Manufacturer of the heater, which is said to produce 4,268 Btu's per hour, is Thermador Electrical Mfg. Co., 5119 District Boulevard, Los Angeles 22, Calif.

The Dow Chemical Co., Midland, Mich., has added E. F. Bailey Co., Inc., of Seattle, Clendenin Bros., Inc., of Baltimore and the Marietta, Ga. branch of Hubbell Metals Inc. to its list of distributors of **magnesium tooling plate** and square magnesium tubing for tooling uses. Dow magnesium tooling materials are now distributed in 11 cities throughout the U. S.

Aluminum **roof jack** provides 50 sq. in. of free area as outlet for ventilating fans and can be used with ducts up to 10 by 10-in or 10-in. diameter pipe, according to manufacturer, Leigh Building Products Div., Air Control Products, Coopersville, Mich.



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For more information and technical assistance on impact extrusions, contact the nearest Harvey Aluminum factory branch listed under "Aluminum" in your classified directory, or write directly to the general offices of Harvey Aluminum, Torrance, Calif.

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# Useful Data

**Various aluminum casting alloys** in use today are detailed in a new manual by Aluminum and Magnesium Inc. The publication, in the form of a looseleaf binder, includes two sets of punched sheets on casting alloys: one covers composition limits and characteristics, the other, mechanical properties, normal uses, and heat treatments. Consideration is given to specification, heat treatment, melting range, conductivity and mechanical properties. Two other sections deal with aluminum fluxes and aluminum extrusion billets. The literature is procurable from D. F. Wright, Aluminum and Magnesium Inc., 1 Huron St., Sandusky, Ohio.

**A line of four-column, single-action hydraulic presses** built by K. R. Wilson, Inc. is illustrated in a 12-page bulletin numbered 95-D by the company. Specifications are given for 48 models (either up-acting or down-acting) ranging from 25- to 1000-ton capacity. The booklet describes and pictures welded steel construction of crowns, beds and sliding platens, align-bored platens, ground and polished columns, hydraulic pumping systems, adjustable stroke control, tonnage adjustment, manual level and electric push button operating controls, and numerous accessories. Address sales manager, K. R. Wilson, Inc., Arcade, N. Y.

**"Ultrasonic Cleaning"** is the title of a 24-page booklet by Branson Ultrasonic Corp. Page one highlights the history of the company; page two lists the contributions of Branson Ultrasonic Cleaning to various industries. Pages 4 to 10 explain in detail ultrasonic cleaning principles including cavitation, optimum frequencies, production of ultrasonic energy, and function of various equipment. The remainder of the book is devoted to Branson Ultrasonic equipment: data on solutions and chemicals, transducers, power generators, ultrasonic generators, and various units and accessories. Write to P. K. Bloch, Branson Ultrasonic Corp., 37 Brown House Road, Stamford, Conn.

**"Flotation Clarification of Water Soluble Oil Coolants,"** brochure FB-102 of U. S. Hoffman Machinery Corp., illustrates and describes various flotation units employed in metal working operations. By achieving continuous automatic clarification of water soluble oil coolants, the units are said to increase productivity of machine tools, and to end down time due to failure of coolant supply and the need for sump cleaning. Hal Kirk at U. S. Hoffman Machinery Corp., Industrial Filtration Div., Thompson Road Plant No. 1, Syracuse N. Y., will supply copies of the bulletin and case histories.

**Tungsten carbide blades** for airless abrasive blast cleaning equipment is the topic of a bulletin issued by Wheelabrator Corp., Mishawaka, Ind. The literature points out that the tungsten carbide blades were designed for use in Wheelabrator abrasive blast wheels to provide long life and reduce blade cost in tough cleaning applications, even with heavy sand contamina-

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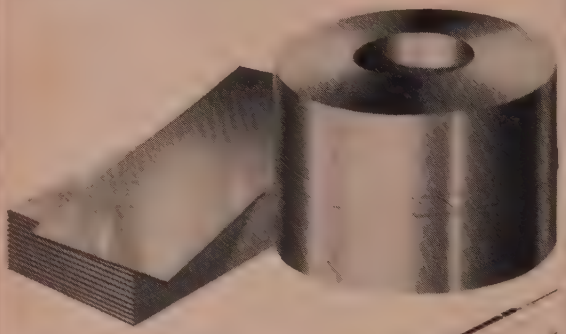

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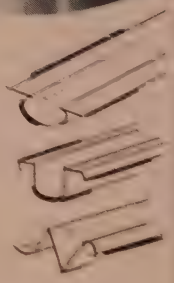

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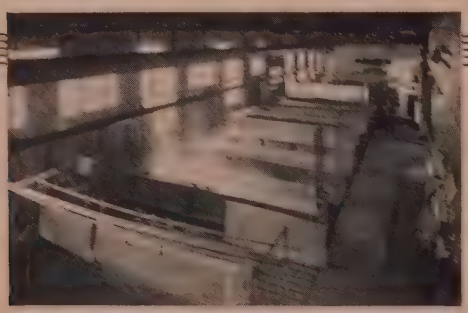

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tion and severe operating conditions. Blast wheel sizes are listed for which the blades are available. R. E. Schalliol at Wheelabrator Corp. will furnish copies of the booklet.

**"An integrated melting** and automatic pouring unit for the production of aluminum die castings" is the phrase used to introduce the new Duplex Ajaxomatic on the cover of the manufacturer's four-page folder, R-48. A machine is shown in operation at an actual plant installation, the electric control units are explained, and a typical floor-plan arrangement is shown. Address requests to Miss Tama, Ajax Engineering Corp., P.O. Box 1418, Trenton 7, N. J.

**Lathes, automatics, and chucking machines** in a new line using modular construction are announced in technical bulletin No. 204 by Cleveland Hobbing & Machine Co., a division of Textron Inc. The company says it can custom-build a machine that will not become obsolete, using a combination of proven components that universally unite with any one of six headstocks and four beds. Approximately thirteen typical Modu-Lathe models and twenty-seven Modu-Lathe major components are illustrated in the 16-page booklet. Write to Cleveland Hobbing & Machine Co., 3737 Chester Ave., Cleveland 14, Ohio.

**Automatic polishing and buffing machines of Acme** Mfg. Co., are the subject of a new folder. Fifteen machine models are illustrated and six adjustable floating head polishing and buffing lathes. Detailed recommendations are offered. Address inquiries to G. Carlson, Acme Mfg. Co., 1400 E. 9 Mile Rd., Detroit 20, Mich.

**"The Inherent Characteristics of Aluminum** that Influence Melting and Holding" by John J. Stobie, western sales manager, Apex Smelting Co., has been reprinted from Modern Metals. The paper emphasizes the importance of proper melting equipment and procedure in the production of aluminum die castings. Copies may be obtained from Parker Ekren, Doremus & Co., 208 S. LaSalle St., Chicago 4.

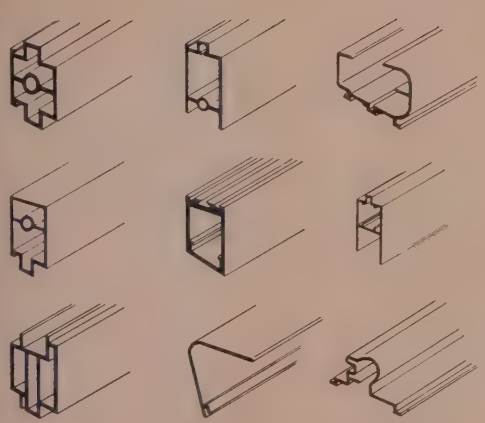
**Process Chemicals for the Metal Finishing Industry** is the subject of a new technical data file prepared by Allied Research Products, Inc. Included are data sheets on the benefits of Iridite chromate conversion coating applied to aluminum and magnesium surfaces; information on Irilac protective coating for all metals; isobrite brighteners, and ARP process chemicals. Two by-lined papers discuss electrically conductive chromate surface conversion coatings and give a survey of chromate treatments. Write to E. B. Zahalka, Allied Research Products, Inc., 4004-06 E. Monument St., Baltimore 5, Md.

**"The Colorimetric Determination of Aluminum** in Phosphoric Acid Bright-Dip Baths," research development of Victor Chemical Works, is discussed in a 7-page booklet. Procedure is outlined including preparation of reagent, preparation of standard curve, and calculations. Results can be obtained in about one-half hour and the operator has control over the bath at all times resulting in more economical operation and improved quality on finished aluminum, according to Victor

Extruded aluminum shapes

for industry

# WELLS ALUMINUM CORPORATION



Responsibility, reliable workmanship and dependable service, we feel, best describe our manufacturing and sales policies. Above all else, they are the things we strive for in our day-to-day operation. With a complete engineering staff, we assume the responsibility of providing our customers with any engineering assistance they may need . . . whether it be for an existing extrusion requirement, or for new, economical ways to employ aluminum extrusions in your manufacturing process. We welcome the opportunity to discuss your extrusion requirements with you.

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Chemical Works. R. J. Comfield at Victor's General Offices, 155 N. Wacker Dr., Chicago 6, will supply copies of the booklet.

**Precision Tube Benders for aircraft** and missiles production are discussed in a 20-page booklet issued by Wallace Supplies Mfg. Co., producers of a complete line of such machines. Here are illustrations of some of the latest Wallace aircraft type bending machines, in nearly every case designed to meet an individual need in a particular problem area. Upon receiving a letterhead request, C. K. Longley at Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Ill., will send out copies.

**A Selector Chart for barrel finishing compounds** is offered by Techline Division of Wheelabrator Corp. Called Chempound Selector, the chart is designed to speed and simplify the ordering of barrel finishing compounds, by recommending a Chempound for any given process on a wide variety of materials. A simple three-step process of elimination reduces the range of Techline Chempounds to one that is best suited to the precision barrel finishing operation at hand. Copies may be requested from Techline Division, Wheelabrator Corp., 2400 Avenue V., Vicksburg, Mich.

**"Three Minutes With Induction Heating,"** issued by Magnethermic Corp., explains what induction heating is, why it is used and shows a few actual installations. Answers are given to questions most often asked about induction heating. Magnethermic develops, engineers, and manufactures all types of induction heating equipment from 60 to 450,000 cycles. Ask J. K. McLaughlin at Magnethermic Corp., 3990 Simon Rd., Youngstown 7, O., for a copy of the booklet.

**"Aluminum Electrical Conductors** — General Engineering Data" enables conductor users for the first time to consult a complete listing of approximately 4000 immediately available sag and tension charts encompassing virtually every type of covered and bare aluminum conductor. A handy desk-top glossary of aluminum conductors, listed alphabetically by code name, is included. Complete list of thousands of sag and tension charts, quickly provided by Alcoa by mail, will enable users to solve problems by reference to charts. The 88-page booklet is punched for desk-top maintenance in a looseleaf binder; the index is file size. Copies sent by Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.

**A Study of Beta Embrittlement in High-Strength Titanium Alloys** by four scientists at Battelle Memorial Institute for Wright Air Development Center, U. S. Air Force, has been published. Beta embrittlement, or the loss of ductility which limits forgeability of titanium alloys, according to the report, is caused by large beta-grain size obtained in many alpha-beta alloys when heated into the beta field. Development of certain alloys, such as Ti-16V-2.5A1, which show a relatively low rate of beta grain growth is recommended as the best way to avoid or minimize beta-embrittlement effects. The 114-page report PB 151278, may be purchased for $2.25 from the OTS, U. S. Dept. of Commerce, Washington 25, D. C.


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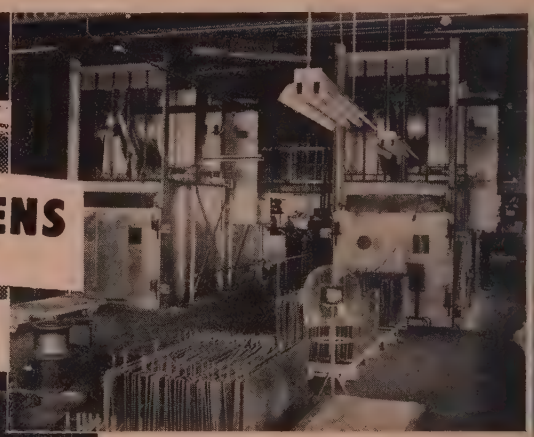

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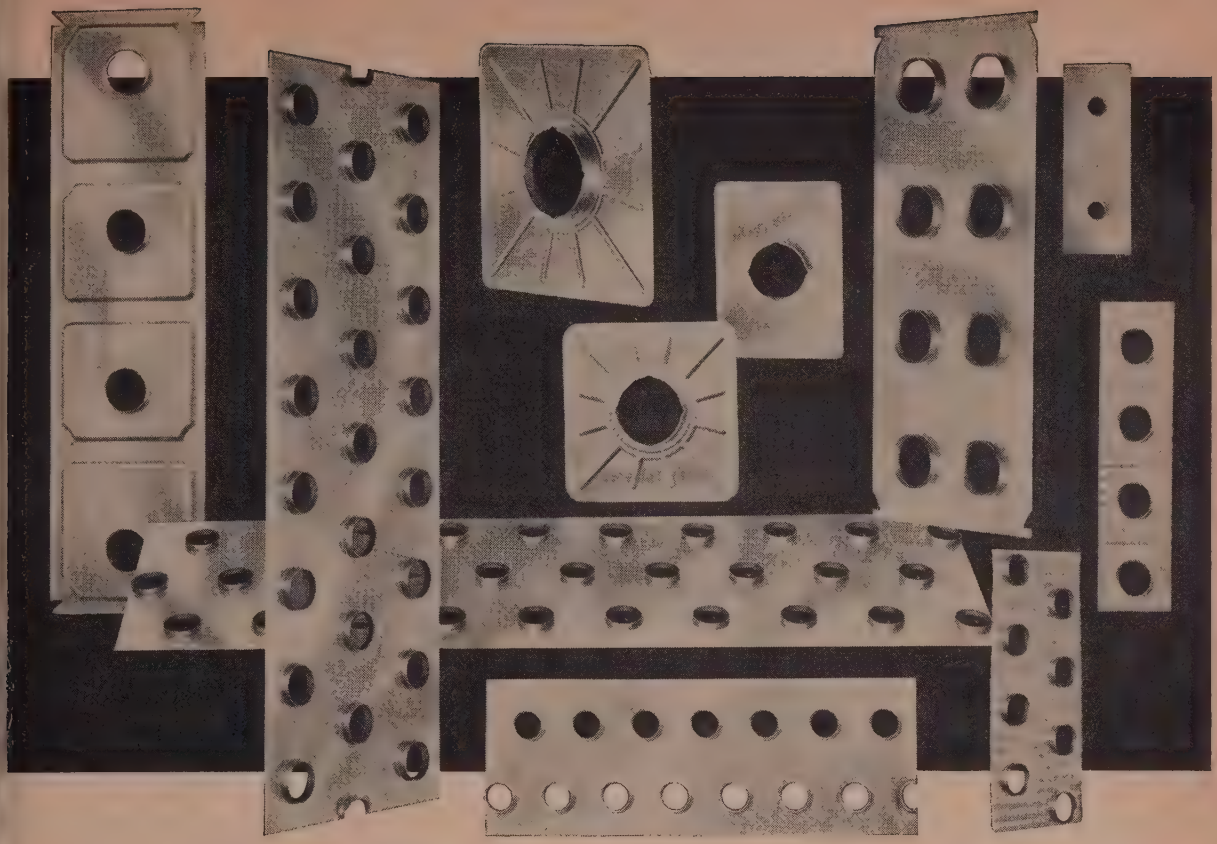
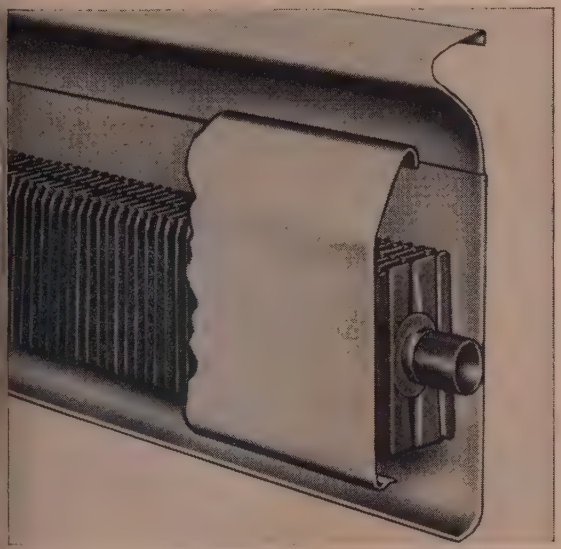


## YOU GET MAXIMUM DESIGN LATITUDE WITH

# FAIRMONT ALUMINUM



National-U.S. Radiator Corporation "Art Comfortline Baseboard" contains an advanced line heating element for a balanced combination of radiant and convected heat. Wrought aluminum fins 3003 alloy, .012" thick, are permanently bonded to copper tubes. Fairmont Aluminum sheet stock is selected for uniformity and excellence of performance.

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# HOW EATON ANODIZES AUTO PARTS

**Major supplier of auto parts has entered the aluminum anodizing business on a large scale; performs meticulous cleaning, surface preparation steps to achieve uniform, high quality finishes. Photo above shows anodized aluminum grilles being packed at Eaton for shipment.**

*by J. P. Coros, Chief Chemist, Stamping Division, Eaton Manufacturing Co., Cleveland, Ohio*

WITH aluminum steadily carving a deeper niche as a basic metal in many automobile components that were once regarded as the sole domain of steel and other ferrous metals, parts manufacturers in recent years have been compelled to convert some of their equipment and production methods to work this light metal into their operations.

Thus, it was only natural, because of the nature of its parts production, for the Stamping Division of Eaton Manufacturing Co. in Cleveland to enter this field. The Division is a leading producer of grilles, bumper guards, and bright finish trim parts which contribute a glamorous touch to the exterior of automobiles.

## Install Automatic Machine

Early in 1958, Eaton's annual budget included an investment in equipment to anodize aluminum so that the metal could be used in a portion of its manufacturing activities. This equipment comprises the Hanson-Van Winkle-Munning automatic heavy-duty, elevator-type sulphuric acid anodizing machinery.

Anodized aluminum is not new. The finishing system dates back to 1926 when it was first used in this country in automobile parts on a very limited scale. In Eaton's process, however, certain steps are taken in the cleaning, bright dip, anodizing, and hot 'seal which provide a high quality anodic coating.

The theory behind Eaton's cleaning cycle, for example, is a good soak cleaner which loosens the buffing compound. This, in turn, is removed by a strong power spray of warm water, followed by another soak cleaner which saponifies drawing compounds and oils used in forming the parts, a water rinse, and a mild nitric acid dip to neutralize any alkali from the previous soak cleaner.

An important step is the conditioning of the aluminum surface in the acid dip to promote a very slight etch. This treatment is followed by a water rinse, then through the drying station prior to the bright dip.

## As Aluminum Builds Up . . .

We have found, after several months of operations, that as the aluminum content builds up in the bright dip, it is necessary to increase the water content and boost the temperature in the bright dip. Thus, the important factors in the bright dip operation are water content, aluminum concentration, temperature, and the time element.

In analyzing these steps it is also important to remember that low water content permits aluminum phosphate crystals to form in the bath and on the work. High water, on the other hand, promotes severe etching. Either condition is detrimental to the quality of the product.

With low aluminum concentration we must operate at lower temperatures of 170 to 180 degrees. As aluminum dissolved in the bright dip solution build

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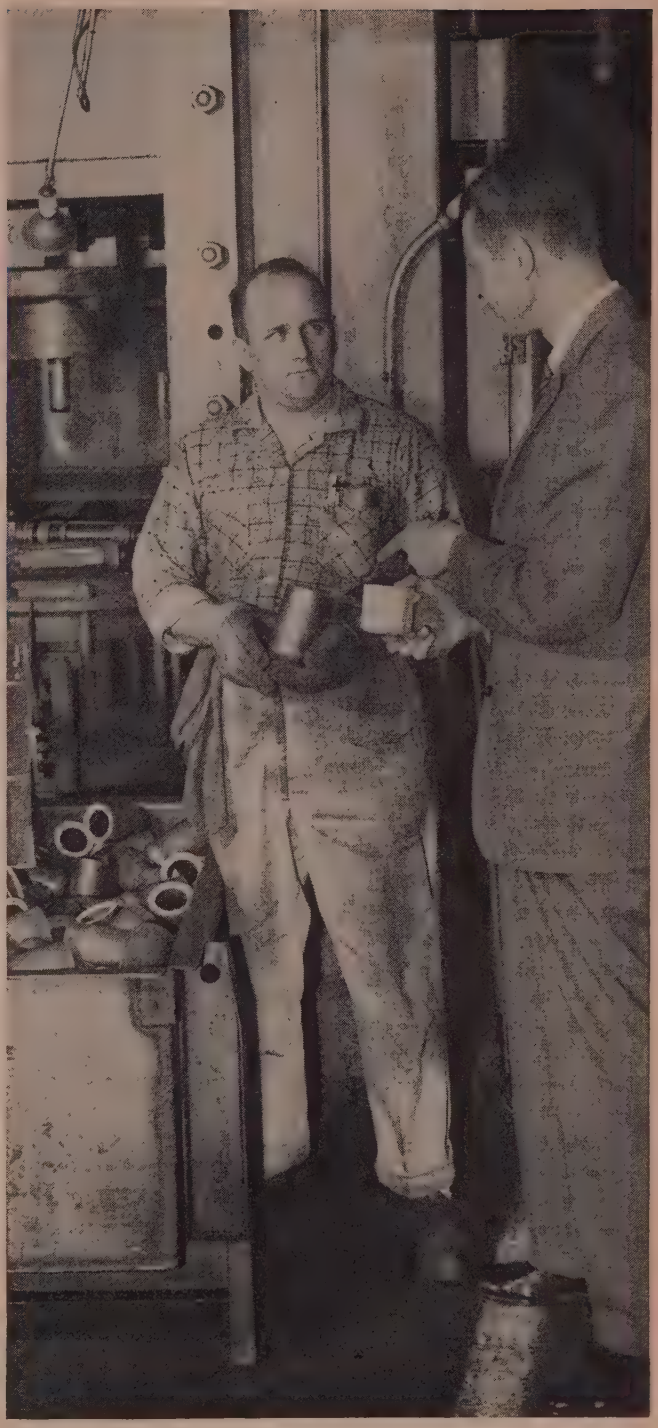
### Metal Preparation

# SERVICE

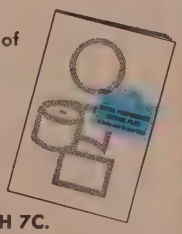
### from Pennsalt

Pennsalt's exclusive Metal Preparation Service Plan gives you complete, planned service geared to the needs of modern high-speed operation. From a nation-wide staff of specialists, you get aid in analyzing new surface preparation needs . . . help in installing equipment and training personnel . . . periodic check-ups with complete recommendations for improved operation . . . laboratory analyses of your special problems . . . advice on thrifty purchasing . . . fast emergency service.

Service like this is another way you profit from Pennsalt's "system approach" to metal finishing. Pennsalt provides a complete line of quality processing compounds and automatic surface treating machines . . . and Pennsalt service makes sure your machines and chemicals always work closely together—the only way to assure highest efficiency, economy and quality in continuous production.



*Write Today* for your copy of this booklet, or ask your Pennsalt representative for more information on the Pennsalt Metal Preparation Service Plan. Write Dept. 157.



**SEE US AT THE INDUSTRIAL FINISHING EXPOSITION, BOOTH 7C.**

METAL PROCESSING DEPARTMENT

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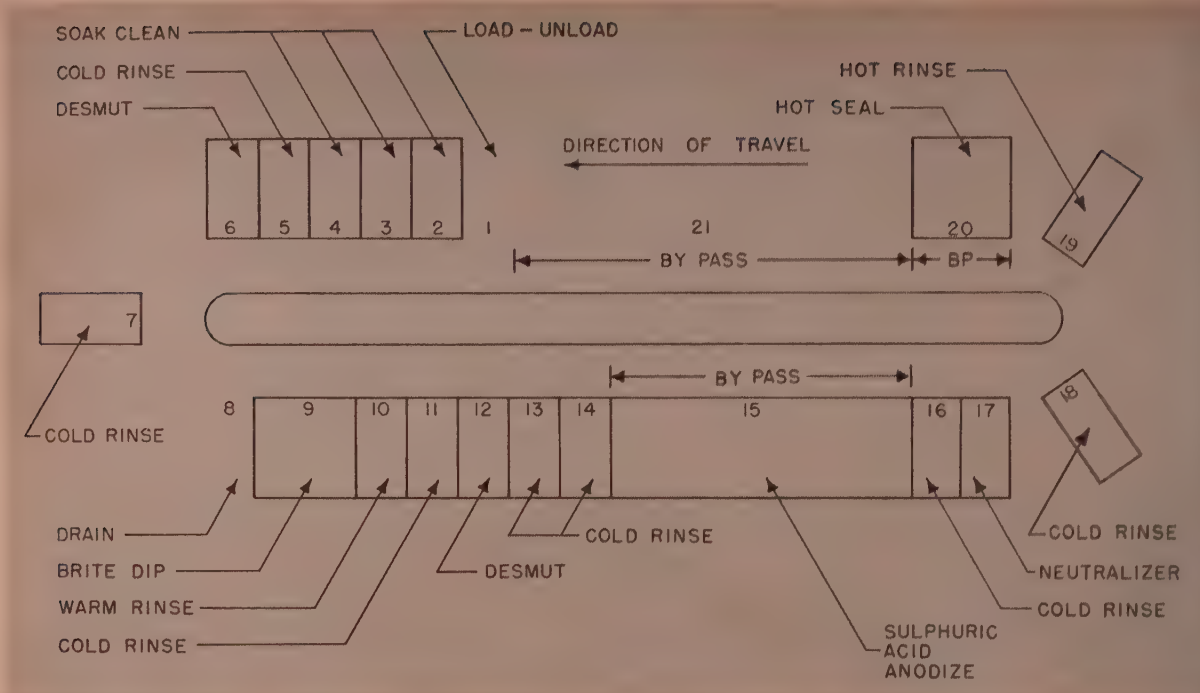



■ ***Anodizing sequence used by Eaton calls for soak cleaning and rinses, a neutralizing acid dip, another acid dip to promote a slight etch, then a water rinse and drying prior to a bright dip. There are five rinses prior to the anodize, after which the work is given four rinses and a seal in deionized boiling water. Equipment by Hanson-Van Winkle-Munning Co.***

up, however, it is necessary to increase the temperature to 190-195 degrees. Operating with high temperature and low aluminum concentration develops etching and dulling.

After numerous tests, we have found that we can obtain maximum results with a bright dip treatment of from 1½ to 2 minutes. There is no appreciable effect on first run production in remaining in the bright dip over 2 minutes.

We have achieved an equilibrium in aluminum content in the bright dip solution since we are dragging out as much dissolved aluminum as we are generating. Contrary to general practice of dumping 10% of the bright dip weekly, it has been unnecessary for us to decant or dump any part of our bright dip solution. Moreover, with careful control of the water and aluminum content, there appears to be no reason why the bright dip solution cannot be run indefinitely.

Following bright dip we have five rinses prior to anodizing. Anodizing is an electrolytic process for producing oxide coatings on aluminum for decorative and protective purposes. The product to be coated becomes the anode. It is placed in a special solution, or electrolyte, of specified composition, through which an electric current passes until an oxide coating of suitable thickness has been formed. The solution is cooled by pumping through a chiller.

After anodizing, the work is rinsed in four separate tanks. Surfaces of the parts emerging from the anodizing process are porous; in order to provide the required corrosion resistance, the pores must be closed. This is accomplished in a hot seal process consisting of de-ionized boiling water. The time in the hot seal is 50% of the period it takes to deposit the anodic coating.

Our equipment comprises the standard design of heavy-duty variable speed elevator-type conveyor. This is a dwell type machine, having horizontal carrier arms for support of the work. All work carriers are of rigid "I" beam construction designed for use with "roll-on" rack.

■ ***A view of the automatic anodizing operation performed on auto grilles, bumper guards and brightwork at Eaton Mfg. Co.***

Each carrier includes an insulated anodic current circuit consisting of a spring loaded contact shoe and rack contact bus bar. The carriers are raised and lowered vertically during transfer, insuring adequate clearance over the barriers and restricting overall length of the machine to a minimum.

The elevator, which is located in the center of the framework, is mounted in bearings on vertical shafts and lifted by crank arms from gear reducers spaced on suitable centers – all operated from one shaft and drive. The elevator moves intermittently and is provided with fixed track at transfer points on which the carrier rolls forward when the elevator is in the up position, to accomplish the transfer.

Hinged flippers, which are also mounted on the elevator in these positions, index the work in and out of treatments having more than one station.

Should it be desirable at a later date to relocate a transfer point to some other position along the elevator, this can be accomplished by moving the transfer track and flippers to the new position. All the mechanism is located between the two rows of tanks so that none is subject to direct convection of corrosive fumes.

# Be Specific . . .

**. . . that's how to get maximum profit out of your industrial advertising dollar in today's competitive metalworking market.**

And here's a market—the light metals industry—that's not only specific, but also growing fast. The industry is summarized below, showing the 25,339 plants by industry category and by region. Every one of these plants processes and/or uses aluminum, magnesium, or titanium in the manufacture of end products.

**CENTRAL STATES**

| | East-N Central | West-N Central | East-S Central | Total |
|---|---|---|---|---|
| BUILDING INDUSTRY | 1759 | 768 | 281 | 2808 |
| CONSUMER DUR. GOODS | 728 | 175 | 73 | 976 |
| CONTAINERS & PKG. | 198 | 50 | 12 | 260 |
| ELECTRICAL INDUSTRY | 678 | 114 | 43 | 835 |
| MACH. & EQUIP. (Non-Elec.) | 1065 | 271 | 58 | 1394 |
| SCIENTIFIC & TECH. INST. | 323 | 54 | 13 | 390 |
| TRANS. & PARTS | 708 | 142 | 53 | 903 |
| ORDNANCE & MILITARY | 22 | 5 | 9 | 36 |
| LIGHT METALS PROC. | 2663 | 461 | 184 | 3308 |
| MISCELLANEOUS INDUS. | 363 | 80 | 31 | 474 |
| Area Totals | 8507 | 2120 | 757 | 11,384 |

**WESTERN STATES**

| | Mountain | Pacific | West-S Central | Total |
|---|---|---|---|---|
| BUILDING INDUSTRY | 183 | 621 | 481 | 1265 |
| CONSUMER DUR. GOODS | 18 | 148 | 61 | 227 |
| CONTAINERS & PKG. | 5 | 63 | 30 | 98 |
| ELECTRICAL INDUSTRY | 14 | 183 | 46 | 243 |
| MACH. & EQUIP. (Non-Elec.) | 21 | 211 | 107 | 339 |
| SCIENTIFIC & TECH. INST. | 14 | 74 | 32 | 120 |
| TRANS. & PARTS | 40 | 310 | 101 | 451 |
| ORDNANCE & MILITARY | 7 | 30 | 5 | 42 |
| LIGHT METALS PROC. | 91 | 642 | 289 | 1022 |
| MISCELLANEOUS INDUS. | 9 | 43 | 29 | 81 |
| Area Totals | 382 | 2325 | 1181 | 3888 |

**EASTERN STATES**

| | North-east | Middle Atlantic | South Atlantic | Total |
|---|---|---|---|---|
| BUILDING INDUSTRY | 436 | 1681 | 760 | 2877 |
| CONSUMER DUR. GOODS | 155 | 459 | 164 | 778 |
| CONTAINERS & PKG. | 48 | 148 | 44 | 240 |
| ELECTRICAL INDUSTRY | 247 | 589 | 105 | 941 |
| MACH. & EQUIP. (Non-Elec) | 204 | 599 | 98 | 901 |
| SCIENTIFIC & TECH. INST. | 153 | 280 | 51 | 444 |
| TRANS. & PARTS | 123 | 300 | 143 | 566 |
| ORDNANCE & MILITARY | 15 | 22 | 17 | 54 |
| LIGHT METALS PROC. | 656 | 1604 | 424 | 2684 |
| MISCELLANEOUS INDUS. | 127 | 403 | 52 | 582 |
| Area Totals: | 2124 | 6085 | 1858 | 10,067 |

**. . by Modern Metals defined and charted this industry, and Modern Metals' circulation list is based on this survey. Here, then, is the most accurate and comprehensive light metals industry list in existence. Only Modern Metals has this dynamic list, made up entirely of manufacturing plants, and only Modern Metals is read in every one of these plants. That's why Modern Metals is by far the most efficient advertising medium for companies that supply materials, equipment and services to light metals processors and users.**

MODERN METALS

**1813 Tribune Tower** **Chicago 11, Ill.**

# ALUMINUM CONTAINERS

*KEEP CARGO SAFE*
*CUT COSTS*
*PREVENT PILFERAGE*

DOOR-to-door, single loading—single unloading containers are meeting with increased acceptance by shippers who appreciate reductions in losses through pilferage and damaged merchandise. Big user of the special aluminum containers is United Cargo Corp., New York, who have 100 of them assigned to their South African trade.

United Cargo expects the 500-cu.-ft. containers to save a shipper up to 24% in marine shipping costs. They were built by American Car and Foundry, Division of ACF Industries, Inc., New York 17.

These containers are constructed of 6061-T6 sheet and 6062-T6 extrusions. Joints are riveted with alloy 6053-T61 rivets. Aluminum is sometimes used in combination with steel with mating surfaces protected against electrolytic corrosion. No special coating is given the aluminum.

"Experience with these alloys in marine service shows this to be unnecessary unless special appearance requirements call for a bright polished surface," an ACF official explained.

American Car and Foundry makes the lightweight aluminum containers in several sizes and capacities. United Cargo's containers are 10 ft. 6 in. long by 7 ft. 4 in. high by 7 ft. 6 in. wide. Inside measurements are 10 ft. 2¾ in. by 6 ft. 7⅝ in. by 7 ft. 3⅞ in.

Door opening is 48 inches wide by 6 ft. 5¼ inches high. Volume of the container is 497.3 cu. ft. and weight is 1425 lbs. Capacity is 10,000 pounds.

## Rugged Construction

The sides are of corrugated aluminum sheet, .051-in. thick with corrugations ⅞-in. deep on 2.9-in. pitch. Sides are reinforced by overlapping corrugations, and the top is riveted on.

The roof rail is a .125-in thick extrusion which permits flush mounting of the carlines with an aluminum roof sheet above. The rub rail is a formed steel shape which is tack welded to the flooring and skids so as to unify all sections of the container. Rivet spacing is about four inches.

The corner posts are No. 10 gauge steel sheets formed into box-like sections. Corner weldments are riveted to the aluminum roof rails. They are capable of supporting fully loaded containers stacked two high. Lifting eyes are provided on all four corners.

The roof is of .064-in. thick aluminum sheet, supported by 1½-in. deep extruded aluminum "Z" sections spaced 18 inches apart.

The blind end is made of .051-inch thick corrugated aluminum sheets which are reinforced by overlapping sheets and riveted at laps. The same aluminum roof rail and steel rub rail are used here.

The hinged door is fabricated of .051-in. thick aluminum sheet, reinforced at the center by 6062-T6 aluminum hat sections and at the corners by .051-in. aluminum gussets. The door can swing 177 degrees on three 8-in. concealed steel hinges which are riveted to the door and bolted to the door posts. The door is equipped with a three-point lock operated by a key, and door handle.

The underframe is composed of No. 14 gauge LAHT steel channels 1½-in. deep, which are stitch welded together and tack welded to the rub rail so as to integrate the floor with the entire container. Two tubular skids are welded to the underframe to form openings for the fork pockets on the sides and to facilitate handling of the container. Skids are reinforced by steel plates. Fork pockets 3½-in. high by 20-in. wide are spaced on 3 ft. 1½-in. centers.

Aluminum to aluminum joints are sealed with alumilastic. All adjoining surfaces of aluminum and steel are protected against electrolytic corrosion.

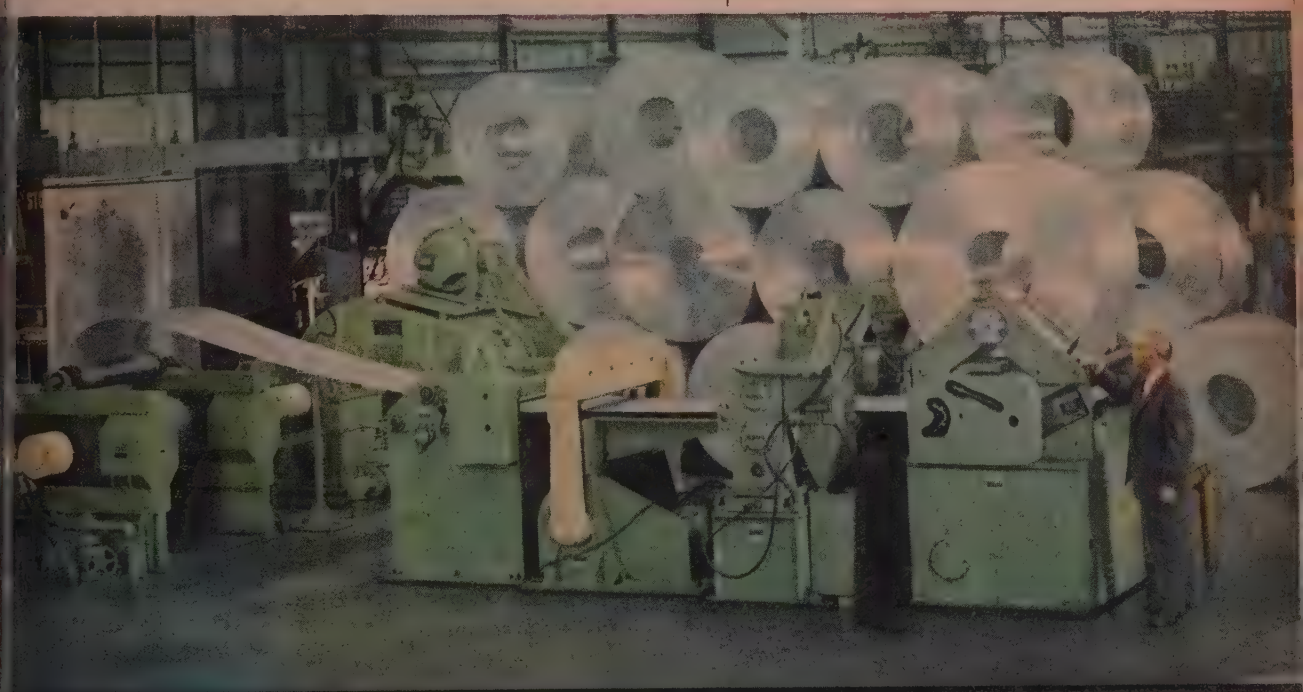
All exposed steel is wiped clean and coated with zinc chromate primer plus one coat of aluminum paint. In all cases it is electrolytically insulated by a combination of zinc chromate and alumilastic.

These containers are part of a materials handling system developed by American Car and Foundry which allows door-to-door shipment of goods via any or all modes of large-scale transportation. Aluminum containers of this general type are being used in over railroad systems, for air freight, and steamships particularly.

# continuous casting of wide aluminum sheet... ANOTHER HUNTER ENGINEERING DEVELOPMENT!

The Hunter Continuous Casting Machine is a radical, new development in aluminum sheet production, bringing revolutionary economies by casting ¼" thick reroll sheet direct from molten metal! This Hunter innovation completely sidesteps the need for conventional billet casting, soaking pits, heavy breakdown mills and hot rolling mills. The casting machine and subsequent processing equipment represent a major break-through in simplified integration for many independent aluminum fabricators now using sheet and foil. It is a typical example of Hunter's many contributions in new and improved methods for producing high quality aluminum materials at lower cost.

Perhaps Hunter's wide experience in aluminum fabricating techniques and equipment design can be useful in increasing your profit margin and improving your competitive position.



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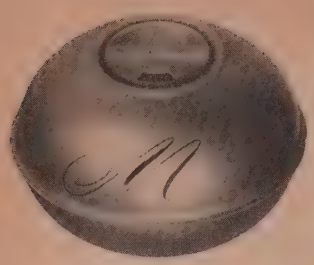

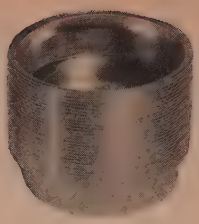

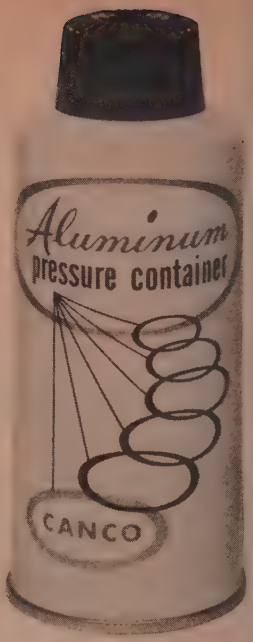


# PACKAGING PROMOTION PAYS OFF FOR ALUMINUM

**Use of aluminum in packaging has doubled since 1953, is expected to double again to over 400 million pounds annually by '63. Ingenious applications of foil and light gauge sheet seen at Packaging Exposition.**

by M. S. Greeley

AN IMPRESSIVE array of packaging products featuring aluminum in both new and old applications were on display at the 28th National Packaging Exposition, held in Chicago's International Amphitheatre April 13 through 17.

The extent of aluminum's invasion of this enormous industry would seem to bear out the aluminum industry's predictions of record foil consumption in 1959 and in future years.

The container and packaging market used 227 million pounds of aluminum in 1958, according to Bert Inch, vice president of Kaiser Aluminum & Chemical Corp., and the total should rise to over 400 million pounds by 1965. These figures include slugs used for aluminum cans, as well as foil.

Last year, rigid foil containers used some 37 million pounds of aluminum foil, compared to about 33 million pounds in '57 and 30 million in '56. The rate of increase has exceeded 10% annually, according to the Aluminum Foil Container Manufacturers Association. About 95% of the rigid foil containers are used by frozen food and bakery concerns.

Aluminum packaging products displayed by many of the 376 exhibitors at the Exposition fall into three basic categories: Laminations and semi-rigid containers of which an outstanding innovation is the boil-in pouch; rigid foil containers; and tubes, closures and cans.

Two basic types of container construction were noted. Formed foil containers are produced by introducing a sheet of foil between matched steel male and female dies. The product has resultant wrinkles on the sides.

Folded end containers are produced by folding a sheet of foil over a mandrel in an automatic press. This container has wrinkle free sides and bottom and a hemmed rim which allows use of foil, paper or film overwrap. Folded containers are used for food products of all types, plants and flowers, seed flats, and shoe waxes and glue.

In occasional applications, such as the aluminum unit container for one serving, the package appears to be more expensive than its contents. However, costs are expected to be cut by improved machines for applying lids to rigid foil containers, and for laminating, sealing and forming containers.

Use of aluminum was prominent in the displays of American Can Co. In Canco's Bradley-Sun Division exhibit, an operating model of an impact extrusion press turned out rigid aluminum impacts similar to those used for pencils, butane lighter fuel capsules, small aerosols, and other products.

First production of extruded aluminum aerosol cans by Bradley-Sun is expected to be in the 6-ounce size. Cans will be lithographed after forming. Canco said that the weight of this can is about 50% that of tin plate.

■ ***In products shown above, packagers exploit shape, size, color possibilities of aluminum. Ekco-Alcoa makes seamless foil containers in multiplicity of sizes, hermetically seals them. The company's condiment shakers prove functional in smooth foil or strong, brightly colored Ribfoil. American Can Co. adds the seamless aluminum pressure can to its line.***

The Division's aluminum cans and tubes are impact extruded at the Washington, N. J. plant. Bradley-Sun began manufacturing aluminum squeeze tubes in 1947, with Colgate Tooth Paste as one of the first commercial products to adopt them. The Division's display of about 100 commercial squeeze tubes included about 50 made of aluminum.

"Of the three materials used for squeeze tubes, tin is the most corrosion resistant but also the most expensive at $1.03 per pound, as compared to 27 cents for aluminum and 11 cents for lead," a company official noted.

Promoters of the collapsible tube say it is here to stay because it protects contents against dirt and germs more effectively than other conventional containers, dispenses the exact amount needed, gives visual evidence of how much of the contents has been used, and preserves contents indefinitely.

Marathon Packages, another division of American Can Co., buys considerable quantities of aluminum foil, lacquered or unlacquered, in various widths according to application. Five basic uses for this foil were exhibited.

A foil-to-paper lamination is used for rigid bake-in containers. Paperboard shells overwrapped with a foil-and-tissue laminate provide protection from moisture for such products as moth balls and coconut. These packages can be thermosealed.

Paper laminated to the outside of foil and printed provides packaging material for medicated candy. A cellophane-foil lamination is used for packaging cheese. And foil laminated to the outside of paper in the form of a band is used to tie together bars of soap.

Continental Can Co. displayed alu-

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*Producers of Quality Aluminum Alloy Since 1938*

Quality aluminum ingot is our specialty. Customized alloys to your exact specifications is our business. Our laboratory is equipped with the most modern equipment—such as quantometer and metallograph to insure that each melt is on-grade metal.

Remember, the best in finished product can only be made from the best quality ingot.

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■ *Kaiser Aluminum's foil crab shells shown above are used to pack, bake and serve frozen deviled crab. They replace natural crab shells which have to be cleaned and sanitized and are unsuited for packing purposes during off seasons. A leading airline uses gold anodized foil shells for serving deviled crab.*

minum cans for a number of applications. most of which are still in the experimental stage.

"Our exhibit of aluminum cans is intended to show that our product and customer research departments are constantly working on the aluminum can," a company representative stated. Foods packaged in these cans included fish, orange juice, beer, and single-portion servings of baby food.

Continental's display of rigid and semi-rigid packages revealed many uses of foil, mostly in laminated form. First product ever packaged in foil by the company was Block Brothers pipe tobacco. All the major tobacco companies followed, and they wouldn't think of using anything but foil now, Continental's spokesman said. Nearly all margarine is now wrapped in a foil-to-paper lamination, but butter makers have not followed suit as extensively.

"The packaging of a hygroscopic product for the liquid feeding of plants required a specially developed lamination," a Continental representative said. "We use a four-layer lamination-acetate, followed by foil for appearance, kraft paper for strength, and polyethylene on the inside because it is inert to chemicals."

Continental's two types of metallic labels, metallized paper and laminated foil paper, are identical in appearance. But the laminated foil paper has more body. It will hold a crease, whereas metallized paper will not.

An important newcomer in Continental's packaging line this year is the cook-in pouch in four types of laminations, two of which use foil. The most economical type—composed of .001 aluminum foil and .002 polyethylene — has been used successfully in pouches for roast beef with gravy and other meats. An outer package is required to shield the foil outside from puncturing. The pouch may be placed in a toaster or boiling water to warm the product.

## Custom Made for Product

"Pouches of laminated Mylar, foil and polyethylene are ideal for delicately flavored foods that need extra protection against oxygen—for example, ham with raisin sauce," Continental says. This lamination requires no outer box because of the protective polyethylene outer layer.

The chief function of foil in the boil-in pouch is decoration, thinks Crown Zellerbach Corp., who also demonstrated the boil-in pouch.

A complete dinner can be prepared from products packaged in the foil pouch by Dinner-Ready Corp., New York. Menu would include sliced turkey and gravy, powdered mashed potatoes, and a beverage. The company plans to market other products in the pouch this year.

Because of its moisture resistance aluminum foil is used in a new bag for large volume packing. Made by Union Bag-Camp Paper Corp., N.Y., this eight-layer bag, called the Union Multiwall, is a polyethylene to foil laminated inner liner. The bag is made in sizes to order.

A Sonoweld 100-watt continuous ultrasonic machine welded .001-inch aluminum foil at 10 ft. per minute at the booth of Aluminum Co. of America. The machine was developed by Aeroprojects Inc., Westchester, Pa. A production splicer has been installed at Alcoa's New Kensington, Pa. foil mill; and others are expected to be installed at Alcoa foil mills in Edgewater, N.J., Alcoa, Tenn., and Davenport, Ia.

The splice is not over 3/32 in. wide and extends to the edges of the foil. In most cases it will not interfere with rotogravure printing. The bond formed has essentially the same strength as the parent foil and also provides an excellent vapor barrier, two important factors to package manufacturers.

Foil spliced ultrasonically will be available first in widths to 38 inches.

Alcoa furnishes closures to six major industries—food, liquor, wine, cosmetic, pharmaceutical, and chemical. Its new Flavor-Lok cap, being adopted by H. J. Heinz Co. for most of its line of strained and junior baby foods, offers easy removal and replacement with a twist of the wrist. Other baby food closures need an opener.

This aluminum cap is made in two pieces: a band which holds the top in place but moves independently of it, and a sealing disc. The two pieces do not separate when the cap is removed from the jar.

"The new cap is applied by the Alcoa (roll-on) principle," explained a closure salesman. "A special Alcoa capping machine, operating at speeds of 600 to 1000 caps per minute, applies cap to filled bottles, creates a vacuum, and molds the sides of the cap to the glass threads. Thus every bottle has a vacuum sealed, tailor made closure."

Mounting demand for the improved two-piece aluminum lid is directly responsible for Alcoa's announcement of a million-dollar expansion at its Richmond, Ind. closure plant.

Alcoa moved its closure plant to

■ *Sample of foil bond formed by ultrasonic welding easily supports a 50-lb. cake of ice. Small roller (inset) vibrates at 50,000 cycles per second to splice ends of foil rolls during production.*

Richmond, Ind. in 1947. Manufacture of aluminum "Goldy" closures started in 1913. The Aluminum Goldy Stopper Co. became the Aluminum Seal Co. and eventually the Closure Division of Alcoa.

For manufacturers who want a pilfer proof closure, Alcoa makes a type which is destroyed when opened or leaves a telltale band around the neck of the bottle.

A new foil-lined corrugated box is said to have all the thermal characteristics of a metal insulated cooler. Haffenreffer Breweries, Boston, is using the container for its 6-pack and 24-pack canned beer. It will keep beer cold for six hours.

A similar carton is being used for Hires Root Beer. The reflective qualities of foil act both inside and outside of the "iceless icebox." Hot foods will retain heat in the containers.

Dobeckmun Co., Division of The Dow Chemical Co., developer of "over 1200 combinations of foil and film," specializes in difficult-to-do packages custom made for the product. W. J. Bader, sales manager, showed several of Dobeckmun's innovations in this field. One is foil zip tape for cigarettes.

Dobeckmun developed a 5-layer lamination for Wyler's Instant Lemonade Mix because the manufacturer wanted a flexible package with the glossy appearance of foil on the outside plus the protective properties of a layer of foil inside. The five layers are foil, paper, polyethylene, foil, polyethylene.

The package for Italian Salad Dressing Mix required only a three layer lamination (foil, paper, and vinyl) since the manufacturer didn't require foil appearance on the outside of the pouch.

Inner-lined bag-in-a-box containers supplied by Interstate Folding Box Co., Middletown, Ohio, use lamination of foil to keep milk dry and fresh. The interior bag containing the instant milk is .00035-inch aluminum foil, laminated to 1 mil polyethylene and 20 pound white sulfite paper. Solid adhesive on the side walls of the box makes a continuous bond with the bag.

Aluminum foil can be made to stretch about 10% when sandwiched between layers of polyethylene in H. P. Smith Paper Co.'s metallic "Polycel." Layers from outside to inside are cellophane for gloss and added strength on the outside, polyethylene, foil, polyethylene. Cellophane is printed on the reverse side before lamination.

Use recommended by H. P. Smith Paper Co. is storage of rustable or hygroscopic materials.

The production of all foil rigid containers is handled almost exclusively by the major foil producers, their subsidiaries, and associates in a particular packaging project. One of the biggest

■ ***Foil-corrugated cartons keep cool products cool, or warm products warm because of the insulating qualities of the foil. These two "iceless iceboxes" are used by Haffenreffer Brewery for 6-pack and 24-pack canned beer.***

manufacturers is Ekco-Alcoa Containers Inc., Wheeling, Ill., jointly owned subsidiary of Ekco Products, Inc., and Alcoa. Ekco-Alcoa features a broad line of containers. A few new developments were noted at their booth.

Small aluminum cans for unit servings of cocktails, jellies, condiments, and syrup protect the product hermetically.

## Convenience Accented

The "E-Z-Por" fry pan which should be popular for the summer barbecue market is stamped out of foil, will hold several eggs or hamburgers, and can be discarded after use. A pot holder must be used, however, to prevent handle from burning the cook's hands.

A package of four sea food shapes—fish, crab, oyster, and clam—illustrates the activities of the design department at Ekco-Alcoa. The new shapes have not yet been sold to a food company.

General process used to manufacture "The Plus Container," Ekco Alcoa's trade name, consists of rolling down .025 gauge stock to the desired gauge, rolling on transparent or colored coatings or spraying on color, shearing stock into desired width, and shaping in a stamping press.

A rigid aluminum foil volume feeding container for the packaging of frozen vegetables, entrees, and specialty dishes will fit all standard size steam tables. Outstanding advantages are reduced handling time (products need not be transferred from container to steam table pans), reduced waste (small quantities may be rapidly prepared as needed in new short time cycle pressure cookers), and labor savings (the disposable container eliminates washing).

Inside dimensions of the container are 11¾ by 4⅝ by 1½ inches. It will hold about 2½ pounds of frozen food.

A complete line of polystyrene domes fits vertical flange crimp containers. Ekco-Alcoa also developed a simple hand closure device which helps worker crimp lids on rigid foil containers. It should be appreciated by the small baker and others who can't afford a large closure machine.

An overwrap or "hooding" machine at Ekco-Alcoa's booth was running at the speed of 3600 pans per hour. Some 20 such machines are in service from coast to coast to wrap such products as TV dinners. The machine was first introduced in '57, and marketed in '58.

Reynolds Metals Co. featured its completely integrated production of aluminum foil folding cartons at the show. Company activities in this field include manufacture of foil; carton research and development; carton design and engineering; multicolor gravure printing; laminating foil to paperboard; and cutting, creasing and folding.

Reycon is the trade name for various Reynolds closing machines. The company now has 23 such machines which perform a variety of jobs from container unstacking to lid dispensing and closing rigid containers. Most of the equipment is available by purchase or on a lease or rental basis.

Among new developments displayed at Reynolds' booth was an aluminum foil vacuum container for luncheon meats and dairy products. The company is also introducing the boilable

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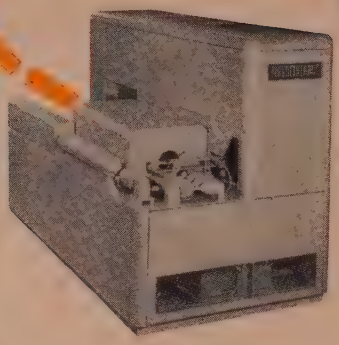

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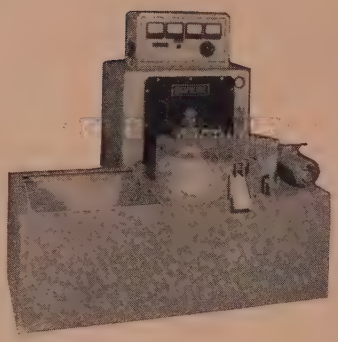

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"pillow pack" for baby food, handy foil package for pre-blocked frozen vegetables, and a cook-in foil carton for prepared vegetables and meats.

"This is the first time the foil vacuum container has been displayed," said Paul Dearborn, director of Reynolds' food markets. "The container retains product freshness, keeps bacteria from multiplying, and makes possible longer shelf life for luncheon meats and dairy products. The package is grease proof, its opaqueness prevents light from affecting product color or chemical composition, and the foil can be made to conform to the shape of the product it encloses, thereby providing savings in space and shipping weight."

## Diverse Designing

Seamless bottles made of heavy gauge alloy 1100 aluminum by American Aluminum Co., Mountainside, N.J., were promoted at the show. Threaded neck and cork closure bottles are made in capacities from less than one ounce to 6 gallons. Standard finish is commercial caustic etch, but chromic or sulphuric anodizing is done at additional charge. The company offers engineering and production facilities for any special aluminum containers, for example laboratory flasks, processing buckets, and reusable shipping containers.

The one-piece 6-ounce aluminum aerosol container is produced by U.S. Can Corp., a Division of Victor Metal Products Corp., Newport, Ark. Four-ounce and 12-ounce sizes will be sold soon, according to Victor. Minimum retail price is $43.00 per thousand in quantities of one million or more. Cans with labels sell for $50 per thousand.

Two divisions of Kaiser Aluminum and Chemical Corp. exhibited at the Exposition. The Aluminum Foil and Container Division is concerned with the manufacture of bare foil rigid and semi-rigid containers and foil lamination. The Aluminum Can Division is the designation for can manufacturing operations. Packing plants include those at Belpre, Ohio (for laminations and printing), Wanatah, Ind. (for rigid foil containers and cans) and Los Angeles (for rigid foil containers).

The company's Aluminum Consulting Team, centered in north Chicago, is a year-old program offering customers in the food and packaging industries such services as metallurgical research, food testing, creative design and development of packages, press dies and production line equipment, and consultation on advertising and promotion.

Space at the A.C.T. research center has increased from 11,500 sq. ft. to 28,000 sq. ft. within the last few months, and facilities have been added for rigid and semi-rigid containers. A pilot laminating facility is in operation there.

The Foilcrimp top sheeter and Rotocrimp rigid foil container closing unit are two recent examples of developmental work. The Foilcrimp machine automatically applies and crimps aluminum top sheets from a coil onto rectangular containers and trays, at the "fastest rate in the industry."

The Rotocrimp unit crimps aluminum lids on containers in a continuous motion. Crimping is done by rotating "plows" which are quickly adjusted to accommodate different sizes of rectangular containers.

A simpler, lower cost machine which

■ *Boil-in-foil pouches offer food protection, cooking convenience. Excelsior Quick Frosted Meat Products Co. packages four entrees in them.*

can be adapted to close any shape container at speeds of up to 60 per minute is known as the ACM-200. Normally the only maintenance required is cleaning and lubrication, according to Kaiser.

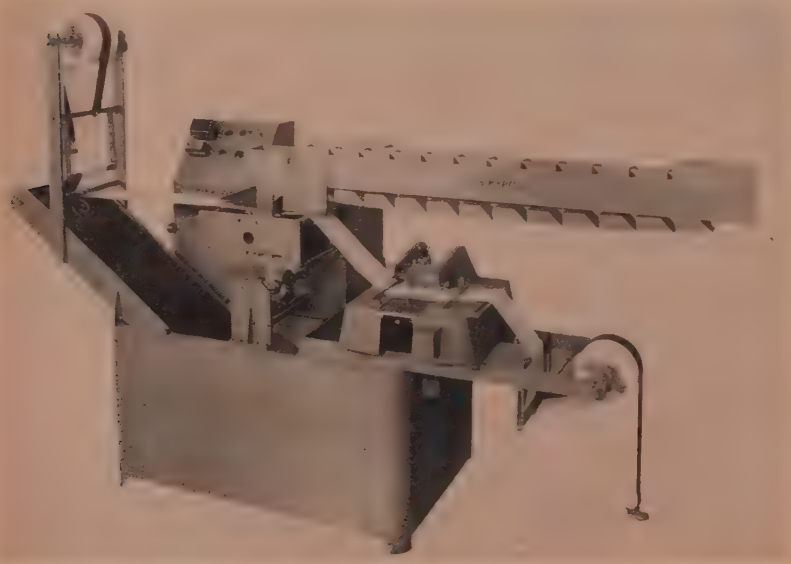
Seamless aluminum cans are drawn by a process developed by Kaiser. Examples are the shallow oblong 6½ ounce can for "Sea Boy" sardine fillets, a beer can, and recently the quart can for synthetic base lubricating oil for jet engines. Some 80,000 quart cans were recently ordered by Lehigh Chemical Corp. for the Navy Fuel Supply Office in Washington, D.C. Use of the new can allows a weight saving of about 2/3 over conventional containers, according to Kaiser.

Numerous companies with borderline interest in aluminum for packaging were present at the show. Kleen-Stik Products, Inc., Chicago, Ill., for example, is concerned with applying adhesives to foil. The company will start soon to apply adhesives to thin gauge aluminum sheet for labels.

Pak-Rapid Inc., West Conshohocken, Pa., produces about 500 different machines for the automatic packaging and sealing of industrial and wholesale goods. One machine forms 50 to 100 packages per minute from any heat-sealable packaging material. Another machine packs surgical blades in aluminum foil. Blades are sterilized in an autoclave and packaged in foil.

The use of aluminum in packaging will double in the next five years, according to F. J. Close, Alcoa's vice president of sales development and industry sales.

Forecasting a 15% increase in use of aluminum in packaging this year, Close sees this as "only the start of a major advance for the light metal during the next few years." by 1963, he said, packaging applications should take over 400 million pounds of aluminum.



■ *Pak-Rapid's machine forms pouch type packages for materials up to 1¼ inches thick. Lamination in rolls is sealed around product in feed slots. Optional attachments count, punch holes, or remove air automatically.*

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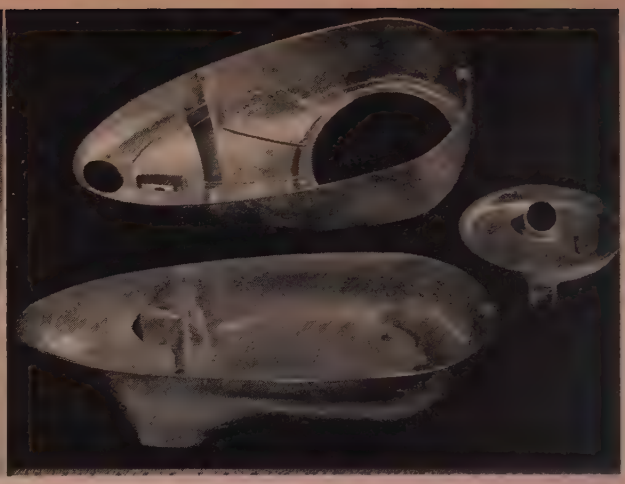

■ *Lid and upper and lower housing are the three die cast parts which form the shell for the Compact vacuum cleaner. Slotted air louvers on each side are punched out from the casting by a special tool. Cam action punches in a hydraulic press create the louvers on both sides in one operation. Aluminum alloy No. 13 provides the necessary castability and ductility to allow punching out of the louvers without collapse of the ¼-in. of metal between louvers.*

# DIE CASTINGS

## *upgrade design of home appliances*

Components for floor polisher, vacuum, and sweeper for carpets reduced to a minimum when die cast aluminum replaced fabricated steel parts. Alloy selection important.

THE USE of aluminum in place of steel in the manufacture of floor polishing and carpet cleaning equipment has meant considerably less exertion for the people who must use these appliances. The use of die castings has granted other bonuses in the form of reduced manufacturing costs and lower retail prices.

Interstate Precision Products Corp., Anaheim, Calif., is the manufacturer of the Compact vacuum cleaner and Polish-Aire floor polisher. These two units weigh a total of only 20 pounds, thanks to die cast aluminum. The most recent addition to the company's line is the Magic Disc carpet sweeper. Conceived in Europe, it has been transformed into a feather-light cleaning instrument by the redesign of 21 sheet steel components into six die cast aluminum parts.

### Die Caster Redesigned It

Credit for this redesign work goes to Los Angeles Die Casting Co., Los Angeles 13, supplier of the components. This firm shares supply of die castings for the Compact and Polish-Aire with another die casting firm.

The principle employed in the Magic Disc involves the use of four free-rolling brushes, positioned alternately at two different angles. These brushes are mounted in four openings at the base and rotate simultaneously as the disc is pushed or pulled in various directions. The brushes penetrate deeply into the pile of the carpet and lift the dirt up and into the four separate compartments (see photo).

The six components of the Magic Disc are virtually ready for assembly as received from the die caster. Only simple broaching or drilling and tapping of cored holes are required prior to decorative finishing. Close as-cast dimensional tolerances insure perfect fit of the mating parts at assembly, and the inherent strength of the aluminum die castings make the sweeper highly durable.

The base and handle socket assembly die castings are polished to a satin finish. Both the top casting and the handle lock housing are given a wrinkle finish by the electrostatic method. Since the remaining two small die castings are concealed in the lock housing, they need no decorative finish.

The Compact cleaner is one of the lightest of its type, weighing in at 12 pounds, according to Los Angeles Die Casting. Its shell consists of three die castings — lid, upper housing and lower housings. Total weight of these parts is six pounds. Outside dimensions of the largest of these shell components are 19 x 9 x 5½ inches. Wall thickness is about .080-in.

### Supports Half a Ton

"In spite of the light weight of the cleaner, it provides one of the most dramatic demonstrations of a product's strength by supporting a weight in excess of one thousand pounds," said Paul Bock, the firm's vice president and general manager. "It's pretty impressive, not only as it relates to the finished product, but also to the strength of the die castings and the suitability of the alloy used."

The Polish-Aire, weighing only eight pounds, also has three die castings — upper housing, chassis, and turbine.

(*Continued on page* 50)

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A 63S Alloy aluminum extrusion, actual size, extruded on a 14-mandrel die. Samples of this extrusion on request
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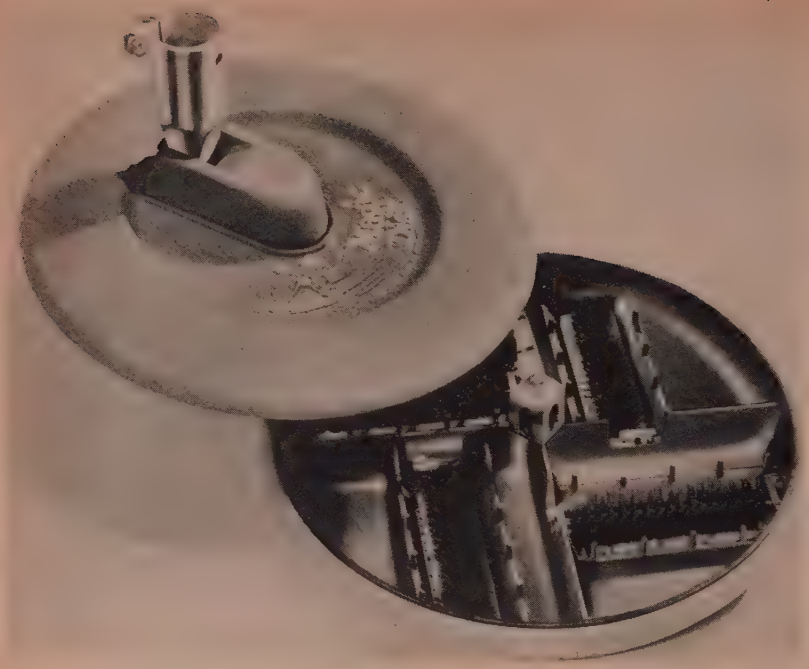


■ *A die casting can replace many structural members. Original design of the Magic Disk carpet sweeper called for 21 sheet-metal parts. Now the unit is composed of six aluminum die castings.*

Total weight of these parts is only 3½ pounds. The Polish-Aire circular brush is driven by the exhaust of the vacuum cleaner when the two are connected by the cleaner's flexible hose. The vacuum cleaner has additional parts such as the rug tool, but all are aluminum.

The upper housing of the cleaner is cast without the seven slotted air louvers on each side of the cleaner (see photo), and thereby hangs a tale of painstaking alloy selection.

"These louvers are actually punched out from the casting by means of a special tool," Bock explained. "Only a high grade, easily castable and extremely ductile aluminum alloy will allow this rather difficult operation, as the wall thickness is only .080-in. and the distance between each louver is ¼-inch.

"The operation therefore calls for an alloy that will not only offer the necessary liquidity and castability to avoid laminations and cold shuts, but also that degree of ductility that will allow subsequent punching out of the louvers without collapsing the metal in between."

### . . . With Cam-Action Punches

Punching the 14 louvers (seven on each side) was a difficult operation until the die caster's methods were perfected by cam-action punches in a hydraulic press which creates the louvers on both sides in one operation.

Bock said that all the desired qualities necessary for this die casting job were found in aluminum alloy No. 13. Apex Smelting Co., Chicago and Los Angeles, is the major supplier of the alloy, which is produced in strict adherence to the chemical compositions required for primary alloys and as specified by either Federal or ASTM specifications, he said.

### 800-Tonner Installed

Los Angeles Die Casting is using 400-ton cold chamber die casting machines on this work. The company recently installed an 800-ton cold chamber machine with a capacity up to 16 pounds of aluminum per shot.

"We're a job shop and have 23 machines in active use in our plant," Bock said.

Strictly devoted to contract operations, "with no captive product to distract us from customer service," the 28-year-old firm operates a 40,000 square foot plant housing a die casting department devoted to zinc, aluminum and copper alloy work, a cleaning department, a tool and die shop, and general offices. The firm employs about 100 in the plant.

Los Angeles Die Casting is impressed with the increasing knowledge and interest of design engineers in the possibilities of die casting accurate parts at moderate cost.

"Not only are they increasingly conscious of this," commented R. Lenfestey, president of the company, "but they seem to be looking more and more in the direction of larger pieces produced to closer tolerances and in better quality than would have been considered possible only a few years ago.

"The technical skill of the die casters, as a whole, is certainly improving to a point where they are in a much better position to meet the exacting dimensional and quality requirements of these design engineers," he said.

### Bigger Machines Coming

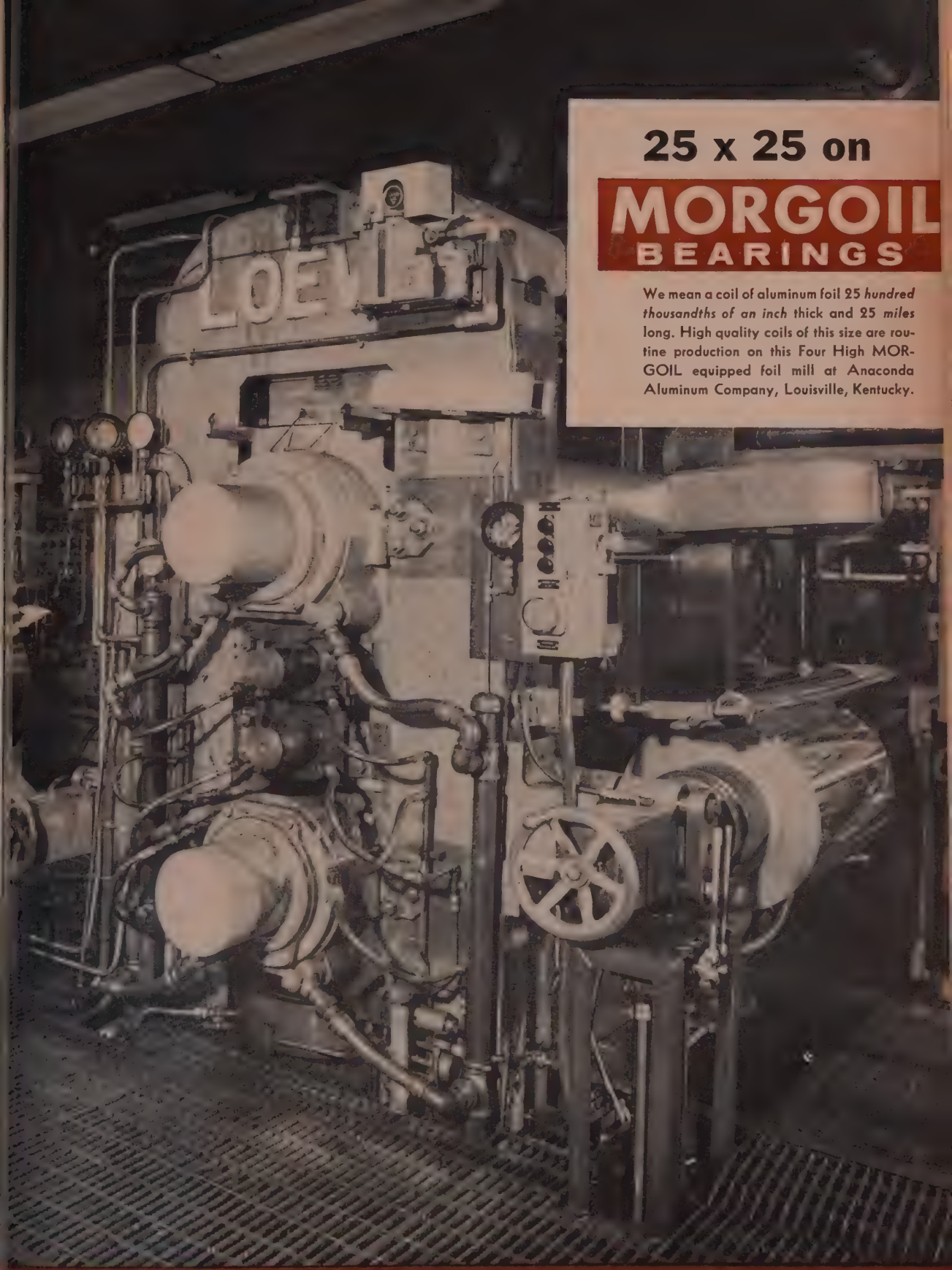
Lenfestey noted the trend of the die casting machine manufacturers toward machines with larger platen capacity than ever before.

"In our opinion, the time is not too far distant when 750-ton and 1000-ton machines will be in much greater general use than they are today," he said. "This would make it increasingly difficult for the small, poorly-equipped 'back-yard' shop to compete."

Lenfestey explained that the cost of this larger equipment would be beyond the reach of the small operator.

With several hundred customers on the firm's books, many of them at remote points in the U.S., the variety of Los Angeles Die Casting Corp,'s production is not surprising. The product list includes components for golf bag carts, gas meter housings and parts, paint spray guns, pen and ink sets for office use, small impellers and other pump components, parts for small air compressors, hand grips for small tools, flow control components, and escutcheon plates.

■ *Case for the Polish-Aire is composed of these three die cast parts, weighing 3½ pounds. The Polish-Aire circular brush is driven by the exhaust of the vacuum cleaner when connected to it by a flexible hose.*



# 25 x 25 on MORGOIL BEARINGS

We mean a coil of aluminum foil 25 *hundred thousandths of an inch* thick and 25 *miles* long. High quality coils of this size are routine production on this Four High MORGOIL equipped foil mill at Anaconda Aluminum Company, Louisville, Kentucky.

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MB 31

# ALUMINUM FIRE ESCAPES

***Patented escapes made by British firm are somewhat higher priced than steel, but will yield substantial savings in maintenance expense in the long run.***

A FIRE ESCAPE is, at best, a necessary evil — especially on hospitals. It is costly to build, to install, and then to maintain. In the case of steel fire escapes, the maintenance cost can add up to a substantial sum over a period of several years.

This is why more and more local authorities in the British Isles are specifying a line of aluminum fire escapes built by a firm in England. The initial cost is "rather higher" than steel fire escapes, but it is not necessary to periodically paint these sturdy aluminum units.

One such installation was recently completed at the Royal Gwent Hospital, Newport, Monmouthshire, where six escapes were fitted. These were designed, manufactured, and erected by Lyte Ladders of Rogerstone, Monmouthshire, and its associate company, Lyte Aluminium Ltd., of the Isle of Man. The installation incorporates the results of several years of development work and includes certain design features that are covered by British and foreign patents.

***One of the six all-aluminum fire escapes recently installed at the Royal Gwent Hospital, Newport, Monmouthshire, England. Use of aluminum reduces maintenance costs, often eliminates need for "to-ground" uprights.***

The primary requirement for hospital escapes is that the platforms should be long enough to allow for the easy manipulation of stretchers around bends. Each escape unit comprises a number of platforms connected by stairways. The platforms, supports, treads, stringers, stanchions and tubular handrailing of these units were fabricated from aluminum mill products supplied by Northern Aluminium Co. Limited. Joining was carried out by the use of aluminum rivets.

## No Uprights Needed

The legs of the platform supports were concreted into the walls to a depth of six to eight inches. Angled supports running from the outer edge of the platforms were fixed to the wall below by expanding bolts — a technique that avoids seepage of rainwater into the brickwork. The platforms were so light that no "to-ground" or upright supports were required.

The stairways were then riveted to the platforms to make a solid construction. It was only where stairways were unusually long that they were fixed to the wall. In these cases a support was lugged into the wall about halfway in order to prevent any tendency to side whip. At ground level the stairways were anchored to a concrete slab.

The treads were made from a special aluminum extrusion of patented design, having a serrated upper surface to provide a safe non-slip surface in severe weather conditions. The stair width of three feet was found to be adequate for the speedy evacuation of stretcher cases, and the handrailing was also designed to give the maximum assistance to hurrying walking-patients or staff.

The effective tread width for fire escapes is governed by the angles of the stairways. Ideally, the stairway angle should be 45° when a nine inch wide tread would be used. In practice, however, it is often found that the angle depends upon the spacing of windows or doors, and the steeper the stairway the less the width of tread required.

During the past four years, the manufacturers have installed some 1200 aluminum fire escapes in industrial, marine and rural environments throughout the British Isles, and these are reported to be giving satisfactory service.

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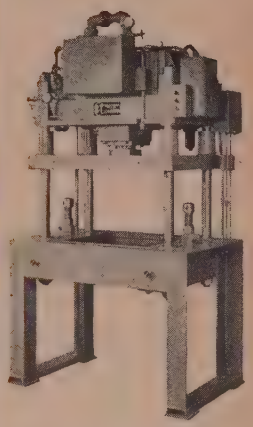

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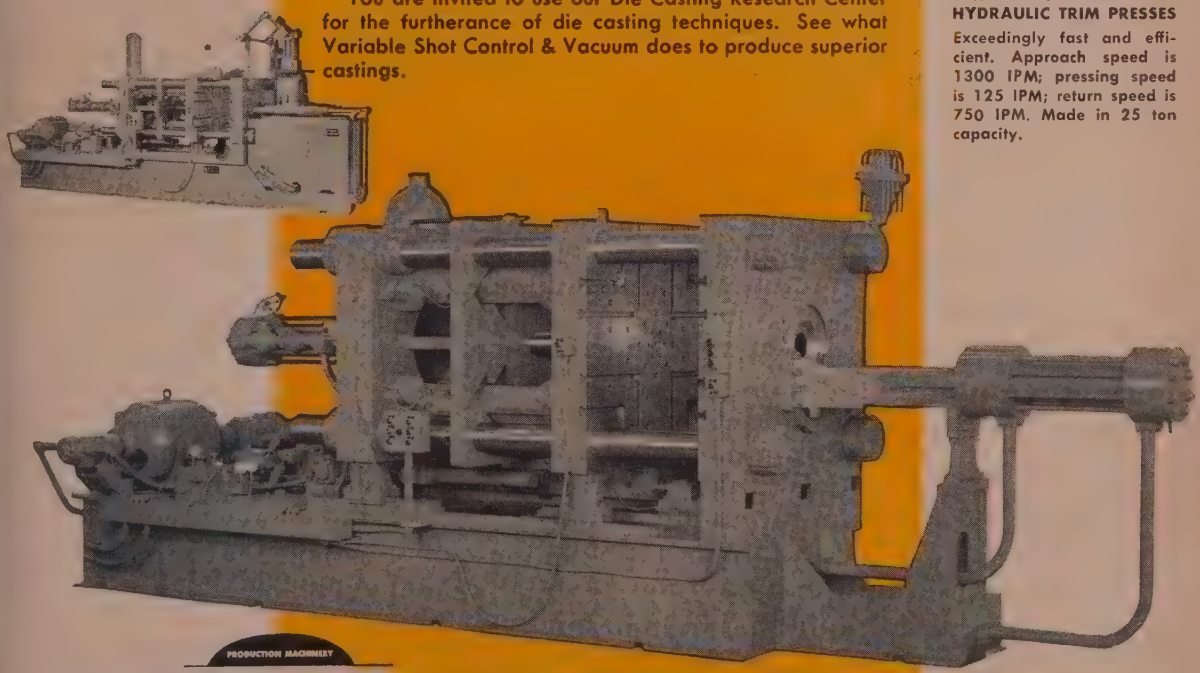

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GREATLY expanded use of aluminum pipelines in the petroleum and other industries is expected to result from the development of a truly portable automatic circumferential welder for butt welding aluminum pipe.

Developed by Aluminium Limited, the machine weighs less than 50 pounds, does not require complicated electronic "programming," is easily operated by unskilled personnel, and produces sound welds by the inert metal arc process.

Manual pipe welding using the inert gas shielded arc system has been used successfully for some time in the Canadian oil industry. Though this has allowed aluminum to compete successfully with other materials, it has required considerable investment in the training of operators. Automatic welding units do not require operators of the same skill, but heretofore they have been expensive, heavy, and required specialized servicing and electronic programming.

As part of its service to the welding industry and to promote the further use of aluminum, the Aluminum Co. of Canada, principal subsidiary of Aluminium Limited, began a search for a solution that would reduce welder training time and establish pipe machine procedures for the suppliers of welding equipment. To satisfy all these conditions it was necessary to make a prototype — the IMA Machine Pipe Welder.

Weighing only 35 pounds, this unit can butt weld a joint in 4-inch schedule 40 pipe in less than one minute arc time without any weld programming. It operates with conventional engine driven DC power sources and will join pipe from 2 to 8 inches in diameter.

Chief features of the design — simplicity, low cost, and light weight — were made possible by taking maximum advantage of the MIG process for welding aluminum. The unit is clamped onto the pipe, for the torch and cable drum gear to be driven accurately about the axis of the pipe. Arc travel speeds are continuously variable from 50 to 250 i.p.m. The direction of rotation can be reversed instantly without disturbing the arc or deposition of weld metal.

The entire rotation mechanism can be adjusted laterally 1½ in. for positioning the weld bead during a welding operation. In addition the torch can be removed from the unit for occasional manual welding or maintenance. It is air cooled to handle 200 amps continuously.

Using a 2-lb. spool of .035 in. dia. electrode wire mounted on the torch, wire feed speeds up to 800 i.p.m. are obtainable. The wire speed is regulated by the voltage across the welding arc. The torch is held in a radial position for all welding, whether vertical, up, down or flat. Manual controls used during welding are located centrally on the machine for ease of operation. Arc visibility is good.

An important feature is that the pipe welding machine can be powered by conventional power sources. There are no electronic circuits. According to Alcan officials, welds produced are of excellent quality having minimum porosity, excellent penetration, and no cold starts or craters. Edge preparation and welding procedures require little adjustment when changing sizes or alloys.

Production units based on the IMA pipe welder design are expected to be available in the near future. In the meantime, welding procedures developed for the machine are being made available through Aluminium Limited Sales, Inc., 630 Park Ave., New York. These procedures cover such matters as torch angle and work angle, electrode wire size, arc travel speeds, edge preparation, weld backing, variations in arc length, wire drive and power sources

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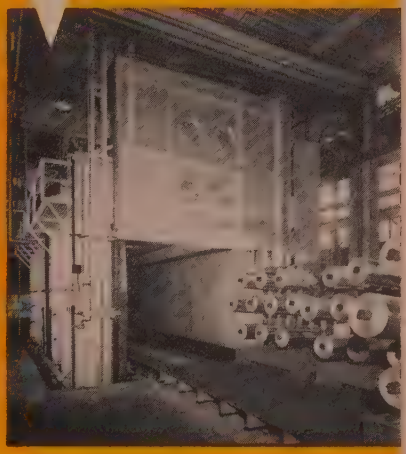

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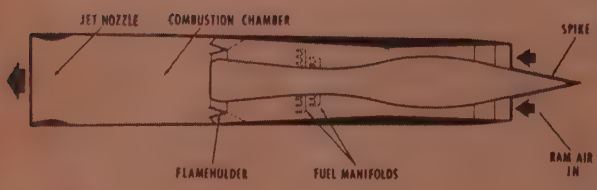
# NEW MAGNESIUM ALLOY
## *improves design of ramjets*




**Extensive test program at Marquardt Aircraft proves out superior mechanical properties of Dow's HM21A-T8 alloy. Good formability and weldability plus high strength-to-weight ratio at 700-900°F and excellent resistance to creep establish its position as a leading missile metal. Magnesium Association Meeting paper details test program.**

*by C. P. King, Marquardt Aircraft Co., Van Nuys, Calif.*

MARQUARDT Aircraft Co. has been using magnesium-thorium alloy HK31A for almost five years. Both the wrought and cast forms of this alloy have found wide application in Marquardt's ramjet engines. The properties which led to the selection of HK31A include its excellent strength/weight ratio, its high strength and modulus up to 800°F, and its good creep resistance.

The ramjet engine is basically a thin-walled, cylindrical pressure vessel and so lends itself largely to sheet metal fabrication. Consequently, when the Dow Chemical Co. introduced its new experimental sheet alloy, HM21XA-T8, interest was immediately focused upon it as a potential improvement over HK31A. An extensive program was conducted to compare the two alloys and to further develop fabrication techniques for processing them into engine components.

HM21A contains 1.5 to 2.5% thorium and 0.35 to 0.80% manganese. In sheet form, it is supplied in the T8 condition -- the first time this temper has been made available on a commercial scale. The cycle employed to produce the T8 temper is: 1. hot roll; 2. solution heat-treat; 3. cold roll; 4. age. This means that HM21A-T8 is received by the customer in the fully hardened condition. Unlike HK31A, it does not require further heat-treatment to develop its maximum strength capabilities. As shown in Figure 1, the physical properties of HM21A do not differ substantially from those of HK31A.

### How They Compare . . .

When HM21XA-T8 and HK31A were compared, much consideration was given to the desirability of using sheet which does not require heat treatment by the user. As gages down to .063-in. were to be used in large cylindrical configurations, the need to avoid distortion caused by heat-treatment was of paramount importance. Further, if a sheet material requiring heat treatment during or after fabrication was designed into an engine, large heat treating facilities would be necessary.

However, the heat treating operation may also be eliminated when using the HK31A alloy if the H24, or cold-worked temper is used. It is only when HK31A is used in the artificially aged (T6), condition that heat treatment is required. Therefore, the following three alloy conditions were compared: 1. HM21XA-T8; 2. HK31A-H24; and 3. HK31A-T6.

Figure 2 shows the ultimate tensile strength of these three materials. HK-31A-T6 is the strongest alloy up to 600°F, and HM21A-T8 shows superiority at 700° and 800°F. In yield strength (Figure 3), HM21A-T8 is the highest at all temperatures from room temperature to 800°F. Its ductility, however, is considerably lower than either HK31A-T6 or HK31A-H-24 at all temperatures. This is to be expected from HM21A-T8's higher yield-to-ultimate ratio.

In a comparison of the modulus of elasticity of these three alloy conditions, HM21A-T8 has the lowest modulus at the lower temperatures, but is superior to the other two alloys at 700°F and 800°F.

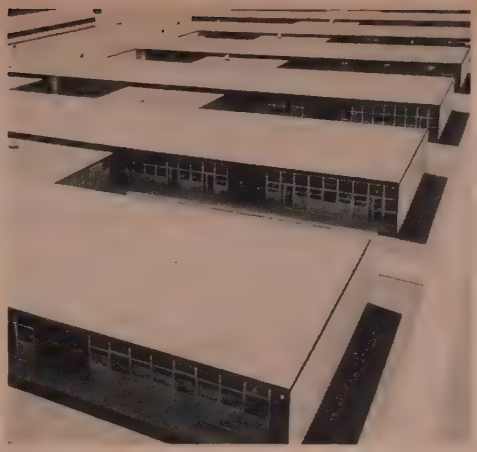
The testing procedure for all these tests employed a fast strain rate (0.01 inches per inch per second); a short heating time to temperature (200°F per second); and a short hold time at temperature (15 minutes). These conditions approximate the conditions prevailing in the ramjet engine components considered, which are heated rapidly to temperature and have to endure these temperatures and stresses for a relatively short period of time.

Because of the potentially large effect

(*Continued on page 62*)

**Fig. 1. Physical Properties of HM21A-T8 and HK 31A Wrought Magnesium Alloys**

| | HM21A-T8 | HM31A |
|---|---|---|
| Density, lbs./cu. in. | 0.064 | 0.065 |
| Melting temp. range, °F | 1202 to 1121 | 1202 to 1092 |
| Thermal conductivity (68°F) Btu/hr./sq. ft./°F/ft. | 80 | 66 |
| Coeff. of thermal expansion (68° to 400°) per °F | $14.5 \times 10^{-6}$ | $14.5 \times 10^{-6}$ |
| Specific heat, Btu/lb./°F | 0.245 | 0.245 |
| Electrical resistivity (68°F) micro ohm/cm³ | 5.1 | 6.4 |
| Heat of fusion, cal/g | 82 | 78 |



*Engineering laboratories at the new Convair (Astronautics) plant, San Diego. All exterior aluminum is protected against atmospheric staining and oxidation with a clear, colorless coating of Butyrate lacquer.*

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**2.** Check Sweet's Industrial Construction File, Sweet's Architectural File, or see 15-M of the A.I.A. Alphabetical Filing System for specification details.

**3.** Send for sound color film. Please indicate the date you plan to show the film and an alternate date.

**4.** Write for names of manufacturers of Butyrate lacquer in your area.

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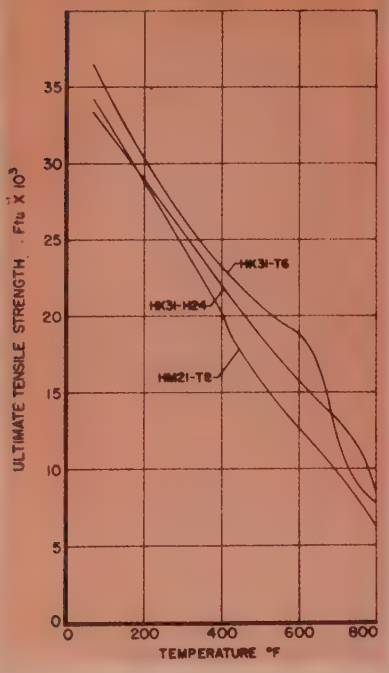
**Fig. 2**




of strain rate, however, it became necessary to know the precise influence of strain rate upon the tensile properties of HM21A-T8. At the lower temperatures, even an increase in strain rate of 1000-fold — from .005 inches per inch per minute to 5.0 inches per inch per minute — does not greatly affect tensile strength. However, at temperatures over 600°F, increasing the strain rate raises the tensile strength several hundred per cent.

The effect of directionality in HM21-A-T8 sheet was also investigated. At room temperature, the tensile strength is about 2000 psi higher parallel to the direction of rolling than when tested transverse to the rolling direction. The difference is reduced as testing temperature increases and above 500°F, direction has no effect upon tensile strength. Ductility and modulus are not affected at any temperature.

Another important property required of missile engine sheet components is bearing strength, a knowledge of which is essential for the effective design of riveted and bolted joints. Figure 4 gives the bearing strength of HM21A-T8 up to 800°F.

The fusion welding of HM21A-T8 presents no more difficulties than the welding of HK31A. The data given below are for butt-welded joints using the high-frequency tungsten arc, argon gas shielded method employing filler rod. Gages tested ranged from 0.063 in. to 0.125 in. The test direction was parallel to the rolling direction. All welding was automatic.

Steel wool cleaning was the only treatment prior to welding. (It had been established that this method of manual cleaning gave results comparable to those obtained by chemical cleaning.) A copper backup plate with a groove of appropriate dimensions was necessary as difficulty was encountered in obtaining uniform penetration without undercutting.

Adequate joint strengths were readily obtained without resorting to pre-heating. Considerable care is necessary in setting up the parts to be welded, particularly in the thinner gages. Misalignment and edges which are not straight and parallel cause severe reduction of joint properties.

The variable which received the greatest attention was the choice of filler rod. HK31, HM31, EZ33 and HM21 filler rods were used in an exhaustive investigation of joint strengths. Little difference was noted in the actual welding operations other than a slight advantage when using EZ33 rod on account of its better flowability.

**Fig. 3**

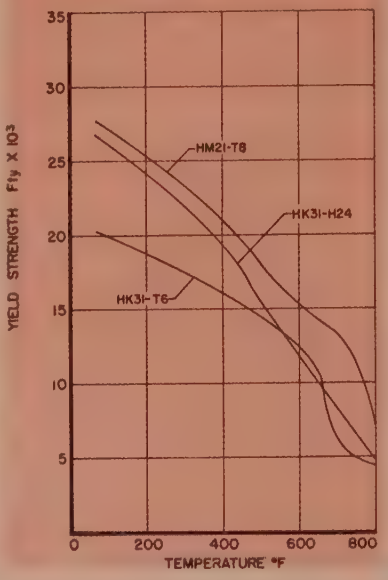



Figure 5 gives the joint strengths of HM21A-T8 sheet welded with three of these rods — HK31, HM31 and EZ33. In these tests two lots of HM21A-T8 sheet were used and welding operations were performed on three separate occasions. Three tests were made on each set of samples.

It can be seen that EZ33 gives the best results up to 500°F while HM31 is better at 700° and 800°F. Postweld heat treatments were tried that reproduced the normal ageing cycle for each rod composition. However, no benefit was found to result from any post weld treatment. The minimum band radius of HM21A-T8 at room and elevated temperatures was not affected by the presence of a weld bead. Corrosion rate of the weld bead was not any greater than that of the parent sheet.

HK31 and EZ33 have both been used in the welding of filler rods production parts. In a year of production, rejects of HM21A-T8 sheet components because of defects in the weld have been negligible. X-ray and dye penetrant inspection are employed to determine the quality of all welds made. Examination of typical microstructure at the junction of the weld bead and the parent sheet showed the fine grain size of the filler metal.

A program was also conducted to determine the techniques to use and the effects of repair welding. As fusion welds up to five feet in length are made in the fabrication of ramjet engine sheet metal components, it seemed probable that repair welding would be necessary upon occasion in order to obtain welds which were 100% sound. Such repair welding was simulated in the following manner.

Two sheets of HM21A-T8 alloy were butt welded using HK31 filler rod material. The bead was then removed on both sides so that the weld was equal in thickness to the parent metal. Another bead was then laid over the first. This approximates the procedure employed in repair welding where cracks, inclusions, voids and other defects must be removed before rewelding. This cycle was repeated until the samples represented sheet which had been welded one, two, three and four times.

The rewelded specimens were tested at room and elevated temperatures; results indicated that at room temperature an increase in the number of weld passes raises the yield strength slightly but lowers the ultimate tensile strength. However, at elevated temperature, the effect of even four welding passes is negligible on both yield and ultimate strength.

Spot welding and seam welding of

**Fig. 4. Bearing Strength of HM21A-T8 Sheet**

| Test Temp. °F | Bearing Yield psi | Bearing Ultimate psi |
|---|---|---|
| RT | 40,000 | 60,000 |
| 300 | 30,000 | 43,000 |
| 400 | 27,000 | 39,000 |
| 500 | 26,000 | 36,000 |
| 600 | 22,000 | 29,000 |
| 700 | 17,000 | 23,000 |
| 800 | — | 11,000 |

E/D=2.0 Pin Diameter=3/16"

# forging a renaissance in COPPER

THE BETTMANN ARCHIVE

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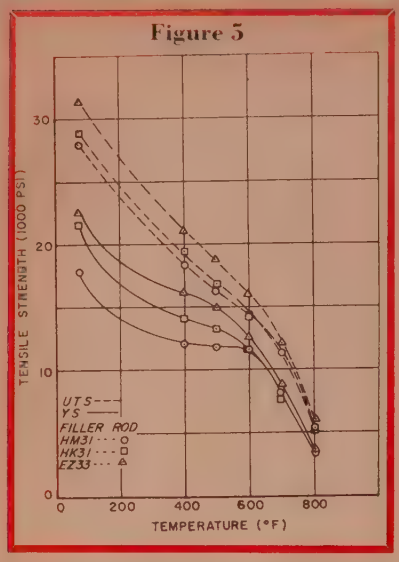



HM21A-T8 sheet may be performed without difficulty. Chemical cleaning was used in early experimental work, but cleaning with stainless steel wool was found to be equally effective and is now used in routine production. The optimum current and electrode force required for spot welding HM21A-T8 are similar to those used for HK31. HM21A-T8 sheet was also spot welded to HK31A-T6 cast material using similar machine settings.

## Long Seam Welds

Seam welds as long as 90 inches were made to join HM21A-T8 sheet to itself, to HK31A-H24 sheet, and to HK31A-T6 sheet. In each case the strength of the joining when tested up to 700°F was 100% of the strength of the weaker material. In no case was there any tendency for the corrosion resistance of the HM21A-T8 to be reduced by a resistance welding operation.

Tests to determine the bend radii of HM21A-T8 sheet up to .125-in. thick at various temperatures show that up to 500°F, no significant reduction in bend radius occurs. In fact, 700°F has to be achieved before the material may be bent over a small radius. Using this 700°F temperature, parts have been successfully fabricated by almost all forming methods, including drop hammer forming, press brake, spinning, deep drawing, trapped rubber forming, expanding mandrel, hot press and hand forming. Three formed components are shown in Figure 6.

A great amount of work was done to determine the limitations of time at elevated temperature to which HM21A-T8 may be subjected for forming without detriment to its mechanical properties. It was determined that no reduction of properties occurred when the material was exposed at 100°F for up to at least 1000 hours. Since no advantage is gained from the use of temperatures over 700°F, this temperature, ±25°F, has been used successfully in all forming operations. Exposing HM21 to temperatures above 700°F produces serious losses in ultimate tensile and yield strengths.

Since the corrosion characteristics of HM21A-T8 are not different from those of HK31, any methods of protection found to be effective for the one will be equally effective for the other. The problems of corrosion of HM21A-T8 fall into three categories: a) magnesium to dissimilar metal contacts; b) assemblies using mechanical fasteners such as rivets and bolts; c) exposed surfaces.

The prevention of all three forms of corrosion by the use of one protection system and the ability to apply this system to both separate components and assemblies would seem to be a materials and process engineer's dream. But the use of a thermosetting tri-polymer resin has made this possible.

## Tough Resin Coating

This resin has good resistance to abrasion and erosion. It may be applied by brushing, dipping, spraying or roller coating, and is unaffected by exposure to 800°F in still air for 15 minutes or 850°F in still air for 10 minutes. At 700°F, its life is virtually unlimited.

Before deciding to employ resin as the sole means of preventing corrosion, it seemed probable that the best protection would result from the application of the resin over Dow 17 or HAE. The presence of either anodic coating did not improve the resistance to salt spray corrosion, either in open exposure or scratch type exposure.

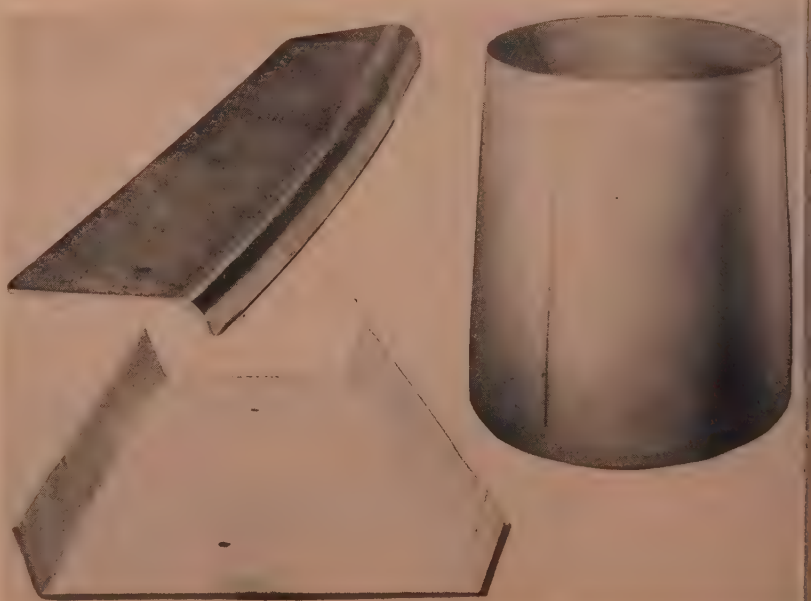
The latter is particularly important as it means that when using the resin alone as a corrosion protection system, scratches through the resin coating do not penetrate at the metal-to-resin interface and spall off the resin. Only the exposed metal corrodes.

## Protection At Fasteners

For protection in areas employing fasteners, the following procedure is being used: 1. drill and countersink the hole; 2. paint the component; 3. dip the rivet in resin and drive while still wet; 4. paint over the exterior.

Galvanic corrosion resulting from contact with dissimilar metal is effectively prevented by painting the other metal and the magnesium wherever contact is made.

Resistance welded joints present a special corrosion problem. Protection of the joint is difficult both before and after welding. However, preliminary work has indicated that another resin-based sealer, not the one referred to earlier, may supply the answer. Applied to faying surfaces before spot or seam welding, this sealer permits a joint of normal strength to be made. The sealer squeezes away from the immediate weld area upon the application of welding pressure and so does not interfere with the actual welding operation. Ample sealer remains around the joint to provide a permanent seal which gives good corrosion protection and is



■ *Fig. 6. HM21A-T8 magnesium sheet up to .125-in. thick can be successfully fabricated by almost all forming methods applicable to sheet material. At upper left, an example of hydroformed sheet; at right, a rolled, welded and expanded shape, lower left, drop hammer formed, trapped rubber process.*

unaffected by exposure to 700°F for short periods.

Although magnesium is the lightest commercially used metal, considerable effort is being expended in the aircraft and missile industries to reduce the weight of magnesium components and assemblies. Chemical milling is being used extensively at Marquardt to obtain the combination of maximum strength with minimum weight. HM21A-T8 sheet and plate are being chemically milled in routine production with very satisfying results.

In ensuring that the chemical milling process and the HM21A-T8 material were compatible, the following conclusions were drawn: 1. the mechanical properties of HM21A-T8 are not impaired by chemical milling; 2. the corrosion resistance of a chemically milled surface of HM21A-T8 is about the same as that of the rolled or machined surface; and 3. the surface finish of HM21A-T8 may be improved during metal removal by chemical milling.

All the foregoing data have applied to the HM21A alloy sheet in the T8 temper. However, HM21A alloy is available in forgings which are supplied in the T5 condition. Roll ring forgings and die forgings are being produced by conventional techniques. At room temperature, the values of HM21A-T5 are not remarkable, but at elevated temperatures they are considerably higher than any other aluminum or magnesium forging alloy.

### Trying New Techniques

Questions concerning the fabrication of the HM21A-T8 alloy are already being explored at Marquardt. For instance, the dip brazing of HM21A-T8 to itself and to the other magnesium-thorium alloys has proven feasible and is now being vigorously investigated. Electroless nickel plating is being considered as a protection against corrosion.

Adhesive bonding is a field with great potential and one which may take its place alongside welding, riveting and bolting as a means of joining HM21A-T8 sheet as well as other sheet materials.

However, even though many such fields of investigation remain to be explored, the place of HM21A-T8 among the high temperature magnesium alloys seems assured. Its characteristics of high strength to weight ratio in the 700° to 900°F temperature range, good weldability, good formability and the fact that it does not require heat-treatment by the user make it of prime interest to the designer of missile structures and worthy of consideration in other applications where these properties are important.

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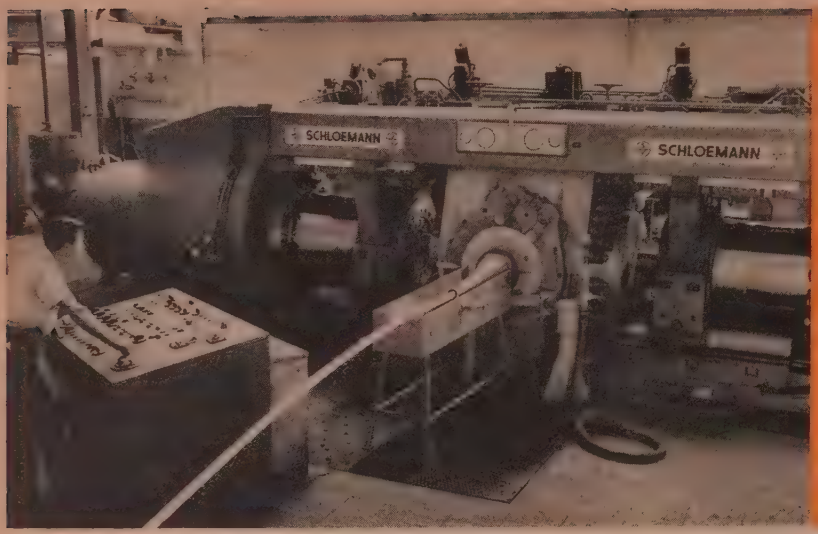



## double–action extrusion press

# SHEATH
# CABLI
# Continuous

EXCELLENT performance characteristics of aluminum-sheathed cable have accelerated the development of equipment for its volume production.

The advantages of aluminum in this application are many. On a volume basis, it is less costly than lead, which has been the dominant cable sheathing material for decades. Aluminum's light weight improves handling characteristics. and its resistance to corrosion is also in its favor. When properly corrugated (see "Flexible Cable Sheath," MM, April '57) it can be spooled on relatively small diameter spools.

A Cable sheathing press (see cut above), built by Schloemann Aktiengesellschaft, Dusseldorf, Germany, has been in operation at the plant of General Cable Corp., Perth Amboy, N. J., since the spring of 1957. (Feller Engineering Co., Pittsburgh, Pa., U. S. representatives of Schloemann, made this and subsequent American installations.

A second Schloemann press went into operation in Germany at the end of that year. Now the firm is completing orders for the last four of seven units for installation in various parts of the world.

The Schloemann press is a double-acting 1600-ton horizontal unit which is capable of extruding wire rod, sections and tubes. A special cooling feature enables the sheathing to be applied onto cores with plastic insulating materials sensitive to heat or onto a dry or impregnated dielectric.

The unit consists of a press with an extrusion head arranged between two containers; two induction-type furnaces; two prefill vessels; pump and accumulator station; electric switch gear; electro-hydraulic controls, and control desk.

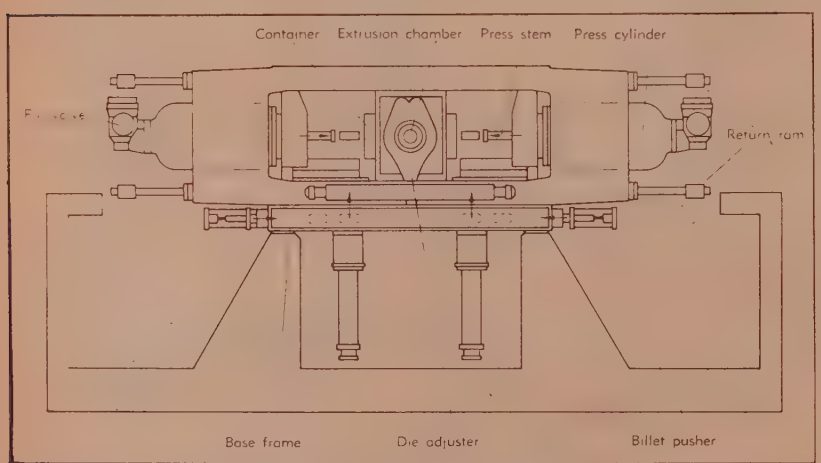
The two induction-type furnaces operate in parallel. They heat the aluminum billets within a few minutes up to extrusion temperature and discharge them to suit the operational cycle of the press. It is possible to use the full furnace capacity of 24 billets per hour each, or to extrude only one pair of billets within several hours. Twenty to 25 seconds after actuating the limit switch, one billet is available in each furnace. The impulse for discharging the next pair of billets is given during normal automatic operation by the press itself in the front end position of extrusion.

As soon as the hot billets have been ejected, two cold billets are charged into the furnace. The hot billets are sent by billet pushers and charging trays in front of the containers, and are entered by the press stems.

During upsetting, the air between billet and container is forced out towards the stem; this is the result of the lower temperature of the billet on the stem side which is obtained in the furnace. In this manner, free of air inclusions, the new billet is excellently welded to the butt end remaining in the container. Extrusion is carried out in such a manner that at the end of the stroke there are always uniform butt ends in both containers.

The cable core is led to the sheath forming tools through a water-cooled heat protective tube arranged in the press head. Heat protection is effective up to the tip of the press mandrel. On the die side, the aluminum sheath formed in the annular slit of the tool is uniformly watercooled over its entire circumference right into the die.

Ahead of stopping points, the extrusion speed is gradually diminished whereby the cable core insulation, also during transition to press stoppages, is only exposed to an admissible temperature. Once the departing aluminum sheath has come to a stop, the cooling device is set automatically to a mixed water-air cooling, and following this to air cooling so as to avoid undercooling of the aluminum remaining in the annular slit.




■ ***In addition to cable sheaths, tubes, sections and wire rod of pure aluminum can be extruded in any desired length. Some of the special features of the Schloemann press are shown on this drawing.***

**Growing demand for aluminum as cable sheath material hastened development of the Schloemann 1600-ton double action extrusion press. In addition to sheaths, tubes, sections and wire rod can be extruded in any desired length.**

The wall thickness of the cable sheath can be kept constant very simply by means of a hydraulic die adjuster before and after press stoppages. This is effected by automatic advancement and retraction of the die in dependence of extrusion pressure. Thus, the wall thickness of the cable remains uniform—also at the stopping points. By the use of a special die, very thin cable sheaths may be produced.

In addition to cable sheaths, tubes, sections and wire rod of pure aluminum can be extruded in any desired length. To this end, only the point of the mandrel and the die have to be exchanged. By means of a special tool, aluminum tubes can be produced which are reinforced by incorporated longitudinal metal wires. Wire rod is extruded in two strands and coiled onto drums in coil weights from 2,205 up to 3,307 lbs. for immediate further processing in wire drawing units.

Each operating cycle is fully automatic. Any operation, however, can also be controlled separately. Each of the two main press rams can be shifted at any speed between 0 and 0.731 ft./min. through infinitely variable delivery adjustment of the pumps. This is of advantage when carrying through a wide-range extrusion program. The press stroke is effected by the pumps, but the advancement of the press stem is carried out by the air vessels so as to save energy. The upsetting and retracting movements of the press stem, however, are made by means of the accumulator so as to save time. In this way auxiliary times are kept to a minimum.

The aluminum sheath is uniformly thick over its entire length and its physical properties are very good. Metallographic tests have shown a very homogeneous and fine grain of wrought structure. The quality of the extruded wire rod meets high requirements. After cold drawing, the specifications proposed by IEC for open wire lines are kept. Because of its better surface finish this extruded wire rod is preferred to rolled wire rod.

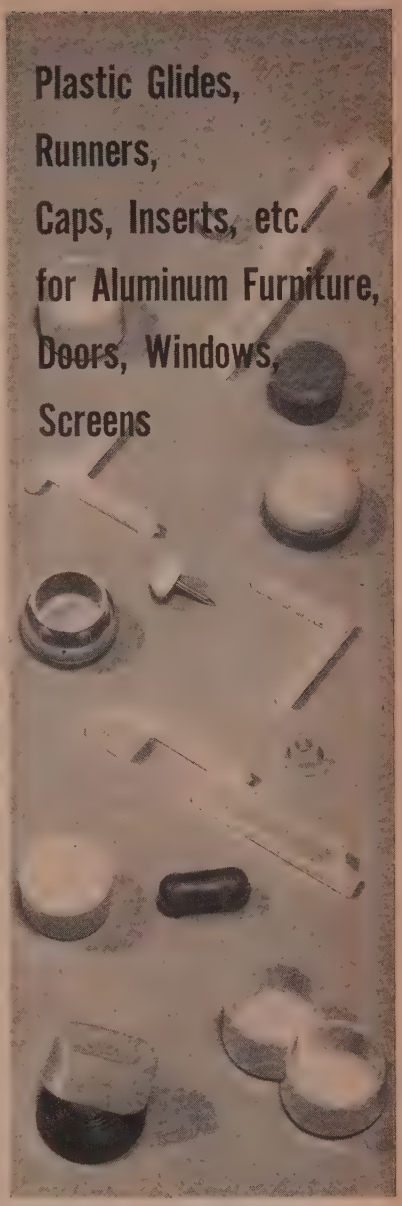
### Ten Tons a Shift

Production capacity stands in favorable ratio to size and power consumption of the press. For instance in an eight-hour shift, about ten tons of aluminum wire rod having a diameter of ½-in. is extruded in two strands.

"At a monthly production of about 140 tons of aluminum wire rod—in 14 shifts—this additional production program alone can amortize the entire plant within ten years, based on the production costs for rolled wire rod prevailing in Germany at the present time," a Schloemann engineer said.

**SPECIFICATIONS OF THE SCHLOEMANN CABLE SHEATHING PRESS**

| | |
|---|---|
| Power | double acting, 1,600 tons each |
| Outside dia. for cable tools | up to 4 in. |
| (weight | 60.6 lbs. |
| Starting billet (diameter | 6⅞ in. |
| (length | 17⅜ in. |
| Starting material | primary aluminum, 99.5% and higher |
| Extruded products | cable sheaths, tubes, wire rod, sections |
| Production (cable | max. 1,631.7 lbs./hr. |
| (wire rod | max. 2,866.5 lbs./hr. |
| Drive | direct oil-hydraulic pump drive combined with accumulator |
| Operating pressure | 4,475 p.s.i. |
| Useful accumulator contents | 33 imp. gals. |
| Delivery, accumulator pump | 12 gals./min. |
| Total delivery, press pumps | 49 gals./min. |
| Press stem speed | 0 to 0.731 ft./min. |
| Furnace capacity | 1,455 lbs. each = 24 billets/hr. |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# PRECISION

## *magnesium extrusions . . .*

**. . . Harris-Seybold realized a substantial saving in machining time on two parts for its paper trimming machines. Material cost was reduced also. Precision extrusions are produced to extremely close tolerances at Dow Chemical Company's Madison, Ill. Mill.**

MACHINING time on two important parts of a paper trimming machine was sharply reduced by the use of precision magnesium extrusions. In making the switch to precision extrusions, Harris-Seybold Co., a division of Harris Intertype Corp., realized a 78.8% reduction in machining time (including setup) on one part of its hydraulic paper trimming machines. Savings on another part totaled 64.3%.

Six machining and allied operations were eliminated when the switch to magnesium precision extrusions was made. Additional savings have been achieved through the virtual elimination of scrap loss after precision extrusions replaced machined extrusions in another metal.

Precision extrusions not only have closer cross-sectional tolerances than are possible with conventional extrusions but can actually be extruded to tolerances as close as those obtained by extensive machining.

Basic material costs, too, have been reduced. When the previous metal was used, a high property alloy was required to minimize warpage as much as possible during the extensive machining oprations. For the precision extrusions, however, a standard magnesium alloy is used.

Even allowing for die charges and a price extra for one-half twist and straightness tolerances, the company has realized a gain on material costs alone.

The parts for which magnesium precision extrusions are used are the six-sided spacer bar and stop carrier strips of the Seybold Auto Spacer unit (cross sections of the parts are illustrated).

Stops mounted on the stop carrier strips actuate a carriage trigger switch that halts the stock for cutting. The stop carrier strips are inserted in slots in the spacer bar. These parts must not only be dimensionally accurate but also free of kinks and bows. They range in length from 46 to 106 inches, depending on the machine model.

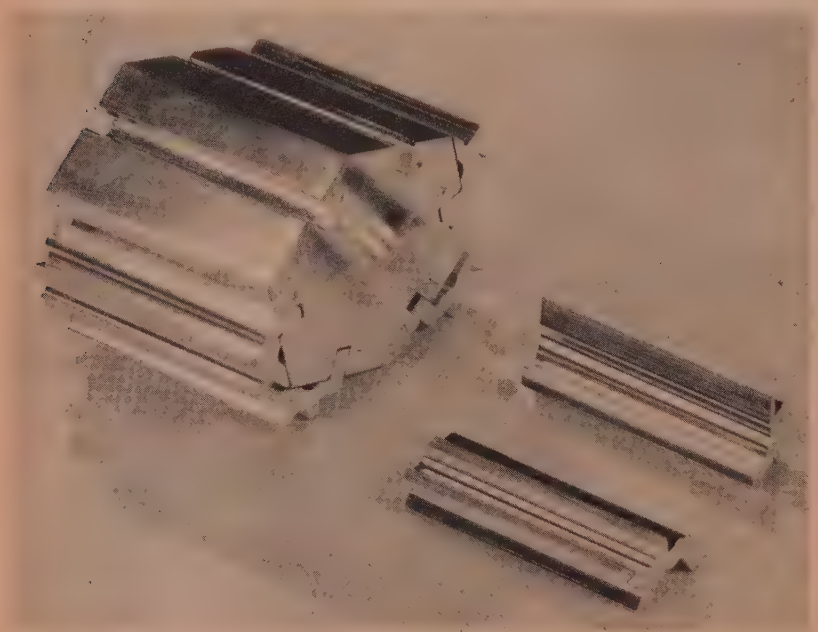
When the previous metal was used, the six slots were milled into a standard hexagonal bar in Harris Seybold's plant in Dayton, Ohio. Now, the company purchases a magnesium shape with the slots extruded in.

The shapes are produced at The Dow Chemical Company's Madison (Illinois) Mill in a two-step operation. First, the shape with slots is extruded in a conventional extrusion press. Then, the shape is put through a draw bench and emerges with unusually close cross-sectional tolerances on the critical surfaces.

The switch to precision magnesium extrusions eliminated three operations on this part — straightening, milling of slots, and burring of slots. By reducing the number of operations from eight to five, total setup and machining time per production run of 10 pieces was slashed from 1750 to 626 minutes.

On the stop carrier strip, the critical dimension of the shape was machined to tolerance when the previous metal was used. Straightening was required when the extrusions arrived at the plant and after machining.

With the magnesium precision extrusion, however, the critical dimension is produced at the mill, thus eliminating the milling operation at Harris-Seybold. In addition, both straightening operations were eliminated. Total setup and machining time per production run of 60 pieces was reduced from 2399 minutes on the previous material to 510 minutes with precision extrusions.



■ *Cross section of spacer bar assembly. Slots in spacer bar were formerly machined; are now extruded to tolerance. Length of parts ranges from 46 to 106 inches.*

# SOUTHERN Extrusions

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***From extruded bar stock:***

# GLEAMING PORTABLE TV HANDLES

***Anodized aluminum fixtures have real functional design, produce such bonuses as production ease, sales appeal.***

EXTRUDED aluminum bar stock was chosen to provide beauty, strength and light weight in handles for portable TV sets. The sequence of fabrication and finishing techniques was developed by Lawrence Aluminum Finishes, Division of Lawrence Brothers, Sterling, Ill., to transform extruded bar stock into an artist's conception of handles for Magnavox portable TV sets.

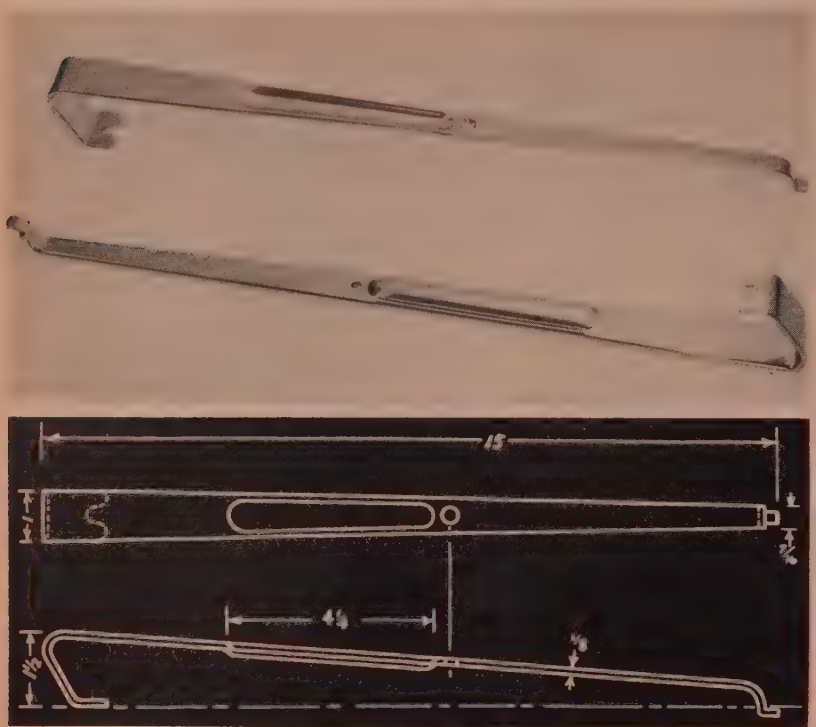
"Finish requirements and the advantage of approximately 20% saving in weight indicated, from the first, that aluminum should be used," a Lawrence man said. "But thorough study and fabricating ingenuity were required to meet cost requirements."

Costs of an elaborate inspection program and many rejects were avoided by selecting extruded aluminum bar stock instead of strip material. Lawrence felt that with extruded shapes a fine, uniform finish after anodizing could be guaranteed.

Precision Extrusions, Inc., Bensenville, Ill., supplier of the stock for this application, pointed out that the aluminum extrusion process places very few restrictions on the design engineer. Alloy 6063 was selected in an easily extruded bar stock shape, 1-in. wide by ⅛-in. thick with rounded edges.

## Anodize; Satin; Bronze

For pleasing eye appeal to harmonize with the TV cabinets, extrusions were to be anodized in durable satin finish, bronze color. A smooth finish is assured because the Lawrence process leaves no trace of starting tool marks after the straight stock is trimmed to size and radius put back in the edges.




■ *Tapered aluminum anodized handle produced from extruded bar stock for portable TV cabinets. Below, working drawing of handle drawn to duplicate artist's design.*

Polishing and anodizing are the two final phases of the 8-operation process outlined by Lawrence for the manufacture of the handles. The first operation consists of cutting the stock to length, shearing the shapes on both ends, and punching a .187 hole. The second operation consists of trimming or cutting the taper.

Sharp edges left after tapering are rounded during the third operation and during the fourth and fifth operations 1½-in. thumb channel and ends are formed with a two stage die. The sixth operation consists of countersinking 21/64-in. diameter by 82° for the No. 8 flat head machine screw.

In assuring a uniform finished color it is important to eliminate drastic metal thickness variations on sections to be anodized, Precision Extrusions pointed out. When change in metal thickness is necessary, it should be kept gradual, eliminating abrupt grain size change on the surface and resulting in a more uniform anodized color.

After the first six operations the product is ready for polishing and anodizing, after which it is a streamlined handle with smooth bronze finish and plenty of sales appeal.

Other extruded aluminum components finished and fabricated by Lawrence Aluminum Finishes include the frame of a wall sconce produced by bending an extruded section into a tear-drop design. Frame is then fitted around a tear-drop shaped background which serves as a candle holder.

Similar mouldings are produced for framing wall clocks of various shapes. Framework for rectangular radio tuning dial is produced from alloy 6063 and etched with the manufacturer's name.

In addition to etching and anodizing Lawrence Aluminum Finishes produces striped or enameled aluminum extrusions. For example, outboard motor cover trim of 6063-T6 extruded aluminum is given a bright anodized finish and enamel striping.

# SCHLOEMANN

## Aluminium Cable Sheathing Press

Double-acting horizontal 1,760 ton aluminum cable sheathing press. Upper: Sheathing power cable. Lower: Two-strand extrusion of wire rod.

Cable sheaths from 5/16 to 4 inches outside diameter and with any desired wall thickness over .008 inch can be extruded onto heat-sensitive cable cores of any length. The extrusion program may be extended by the production of wire rods, tubes and sections. Full automation of the operating cycle assures uniformly high quality of the product. SCHLOEMANN aluminum cable sheathing presses are operating in the U.S.A. Germany and other countries; main design features are protected by patents.

**FELLER ENGINEERING COMPANY** 1165 Empire Building, Pittsburgh 22, Pa.

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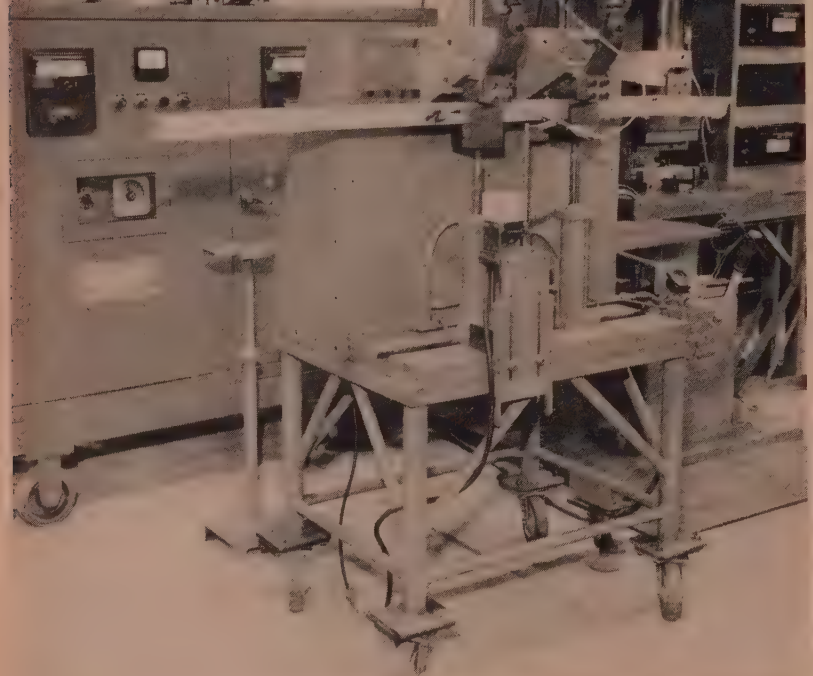
# RESISTANCE HEATING

## *simplifies forming of hard alloy aircraft parts*

New resistance heating units speed Grumman Aircraft's forming of aircraft components, gaining the advantages of high heat concentration, cleanliness, economy, and adaptability. Their ability to maintain temperatures within a narrow plus or minus tolerance satisfies critical government heating specifications.

RESISTANCE heating units have enabled Grumman Aircraft to speed up the forming of aircraft components including aluminum alloy wing span sections of its SA-16B Amphibian.

The principal advantages of resistance heating are its high heat concentration, cleanliness, speed, economy and adaptability. The recent installation of two 100-KVA Sciaky RHU units has enabled Grumman to take advantage of these traits in forming aircraft components.



■ *Sciaky resistance heating unit. Heating and forming wing span sections at Grumman quickly shapes critical primary strength members. Hydraulic pressure is applied to a clamping device holding wing span. 100 KVA RHU is shown at left; 50-ton forming press is at right.*

This process has been successful in satisfying critical military heating specifications. Various alloys are best formed at specific temperatures, which must be maintained within a narrow plus or minus tolerance. To overshoot or undershoot a required temperature may cause cracking or metal fatigue.

The Sciaky resistance heating unit is a precise heat generator which localizes the heat between holding clamps at the desired work area. It replaces cumbersome heating furnaces and exposed direct flame contact devices.

### Production Facts

In production, the primary structure is brought to preset temperature while being held by clamping force. When heated, the span is removed and transferred to an adjacent hot forming die where it is shaped.

In most respects, the resistance heating unit and the resistance welder have a great deal in common. Both use step down transformer (secondary output of high amperage, but very low voltage) as a main power source. Cables with couplings or clamps from the RHU are short circuited to the work piece.

However, in the case of the welder copper electrodes within the secondary circuit hold the piece parts together under pressure. In both instances, heat is generated by the electrical resistance of the part as current is passed through

The difference between the two the end result — the RHU merely hea

while the welder uses a more intense heat for a very short time interval to fuse or weld metals.

The wing span section (or cap strip) is shaped to approximately 90° from aluminum angles measuring ⅜ or ¾ inches thick. Alloy is 7075-T6.

In the heating operation, the span is hydraulically clamped in place under 600 to 800 lbs. pressure. A hand-operated pump builds up pressure, but piston retraction is by means of air pressure. A spring-loaded thermocouple is then swung into position and locked so that its i/c thermocouple is in contact with the work piece. It takes one to three minutes for temperature to come up to 350° F, depending on cross-sectional area.

At 350° an external thermostatic control institutes two signals — (1) to cut off the short-circuited heating current to the two clamping dies, and (2) to trip the spring-loaded sensing thermocouple, which swings away about 90°. This swing-away insures against damage to the thermocouple as the heated part is removed.

Then the clamps are removed, and the heated part is transferred to an adjacent 50-ton forming press to be shaped as specified.

The clamping mechanism was designed at Grumman under the direction of Allan Brown, welding engineer. In the two years that it has been in operation, it has heated a variety of parts in the 7075-T6 aluminum alloy. The gauges have ranged from 1/32 in. to ¼ in. for stringers of the F11F, F9F8T and S2F aircraft.

### Dual Heating

In the Grumman installation, two 100 KVA transformers with associated controls are enclosed in a sheet-metal housing mounted on a rubber-tired truck. Only one transformer is in use for this particular application. Each transformer is thermostatically cooled and each secondary voltage range is from 6.2 to 22.6 volts.

A terminal board is provided for connecting the two transformers separately to either "C" or "D" size ignition contactors. Controls for each of the contactors contain "start" and "stop" buttons, heat controller, heat timer, voltmeter, and indicator lights for "heat on" and "timer on." With this arrangement, it is possible to separately heat two elements at one time, e.g., upper and lower dies of a forming press.

Either a heat timer or temperature controller can be used. However, for this application, Grumman has provided a thermocouple for interrupting the current flow when the desired temperature is reached. Each temperature controller has a 0° to 1400° F range.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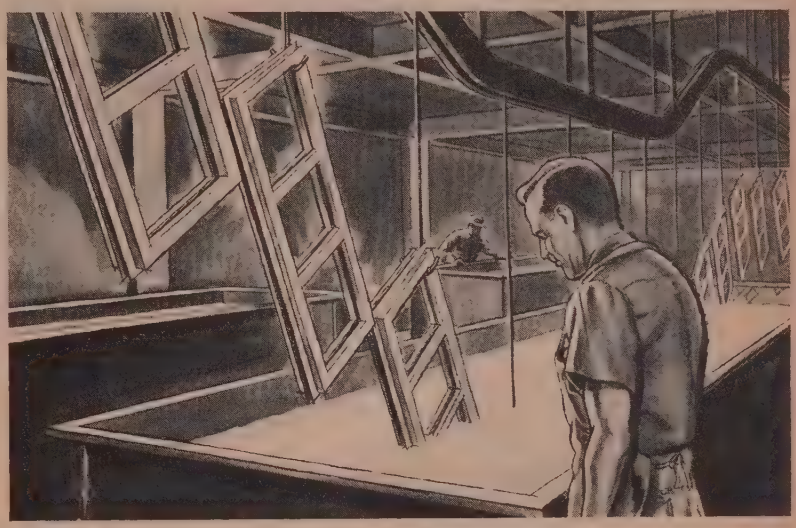

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Oakite controlled etching gives you a perfect satin finish when you want to enrich the natural beauty of aluminum, as on window frames or storm doors. When you want to prepare aluminum for paint, anodizing or lacquering, you get just the mat finish you need.

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# Light Metals Castings on the REBOUND

**Aluminum foundry volume is starting to climb toward previous heights, thanks to strong commercial and military demand. Magnesium people's optimism is based on anticipated growth of missile requirements.**

*by Kim Darby, Associate Editor*

AFTER a decided business dip in the middle months of 1958, aluminum foundry and die castings operations show signs of a steady climb toward pre-recession peaks of 1955 and 1956. The Government's shipment figures bear this out (see cover), and the outlook of 22 light metals foundries surveyed at the Engineered Castings Show in Chicago's Hotel Sherman last month reported high optimism for business in the months ahead.

The magnesium picture is less well defined. Here also however foundrymen like what they see, thanks mainly to the rising volume of aircraft and missile prototype and contract work.

Exhibitors at the show, sponsored by the American Foundrymen's Society in conjunction with its 63rd Castings Congress included 22 firms devoted entirely or partially to aluminum and magnesium foundry work. Doehler-Jarvis Division of National Lead Co. was the only exhibitor that makes die castings only. The only other die casters were Bendix Foundries and Hampden Brass & Aluminum Co., both of whom produce castings by the sand, permanent mold, and other processes.

Foundry people at the Sherman had mixed feelings about the show, but the majority favored this type of promotion; agreed that results justified the investment. Two exhibitors said that they had bought space in other metalworking shows in the past, but intended to stick to the AFS show in the future.

Certainly there was much to interest the 4500-odd representatives who registered. Considerable light metals activity for missile and related applications is reported by Rolle Mfg. Co., Inc., Lansdale, Pa. Rolle is busy promoting the use of MSR, Magnesium Elektron's new high strength magnesium casting alloy which is said to be competitive with Dow's EK31.

"MSR has the highest yield strength of any magnesium alloys used today," Wallace Stengl, a Rolle metallurgist, said. "With 0.2% yield strengths of 25,000 to 36,000 psi, MSR is directly comparable with high strength heat treated aluminum alloys."

Alloying additions in MSR include 2.5% silver, 2.0% fractionated rare earth metals, and 0.7% zirconium. Ultimate tensile strength on separately cast test bars ranges from 34,000 to 43,000 psi with elongations of 2 to 10%, the values depending upon composition. The alloy has good short and long term creep resistance, and is immune to stress corrosion failure.

Pressure tight and complex castings are readily made in MSR, with exceptionally uniform properties in different parts of the casting, Stengl added. Missile and aircraft firms are the main market for the new alloy because of its high strength, high temperature properties. MSR can be cast by the same methods as other magnesium alloys.

## Big Ones for Nike

Rolle is producing huge sand castings for electronic guidance systems for missiles. Overall dimensions of the two-part units (upper yoke and base) measure about 114x93x78 inches (see photo, page 78). Magnesium provides the light weight necessary for mobility, while casting gives the high rigidity required for control accuracy. No assembly of wrought components could produce this rigidity, Stengl pointed out.

Another large magnesium sand casting produced in quantity at Rolle is a 10-foot diameter parabolic reflector weighing about 800 pounds.

Even more interesting was the magnesium centrifugal pump impeller housing, made of ZH62 alloy for a high-classified military application. Presumably the pump is for some missile system or new aircraft, but it suggested at least one possible future use in the chemical industry.

Dr. Fred J. Dunkerley, assistant general manager and director of quality control at Rolle, called attention to the Lycoming turbo-prop engine housing which his firm is producing for the Gas Turbine Division of Avco Mfg. Corp.

"This ZH62 alloy sand casting is a core mold and weighs in the neighborhood of 70 pounds," Dunkerley said. "It's an excellent example of a difficult casting produced in quantity."

While sand casting is the big activity at Rolle, permanent mold and investment castings (this last in a wide range

**A Rolle Mfg. Co. product is this sand cast housing for Avco's Lycoming turbo-prop engine. The ZH62-T5 magnesium alloy casting weighs about 65 pounds as shown. Production requires the use of intricate sand cores which are assembled into a dry sand mold 40 x 40 x 50 inches. The casting is essentially two telescopically arranged cones, with the outside cone having a double wall and the cones joined by six hollow struts.**

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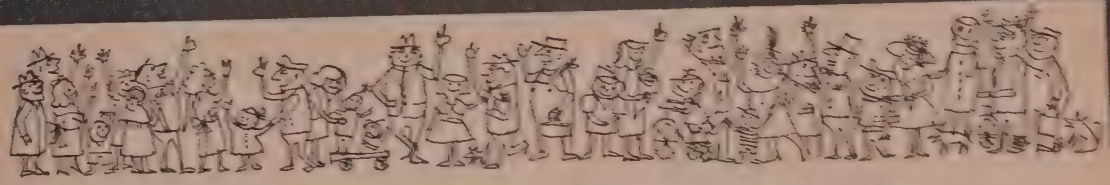

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*On Alcoa Presents* (ABC-TV Network, every Tuesday, 10:00 p.m., EDT) . . . three more sporting goods commercials, presented on one of the nation's most dramatic television series to a skyrocketing audience of more than 23,000,000.

*On Network Radio* . . . reaching an estimated 3,000,000 listeners with multiple sales messages on aluminum sporting goods.

*MARKET-MAKER symbolizes Aluminum Company of America's year-round sales-stimulating programs for manufacturers and retailers of aluminum products. Watch for other "Market-Maker" promotions of FURNITURE • HARDWARE • GIFTWARES • BOATS, MOTORS AND ACCESSORIES • COOKWARE • MAJOR APPLIANCES • RESIDENTIAL BUILDING PRODUCTS

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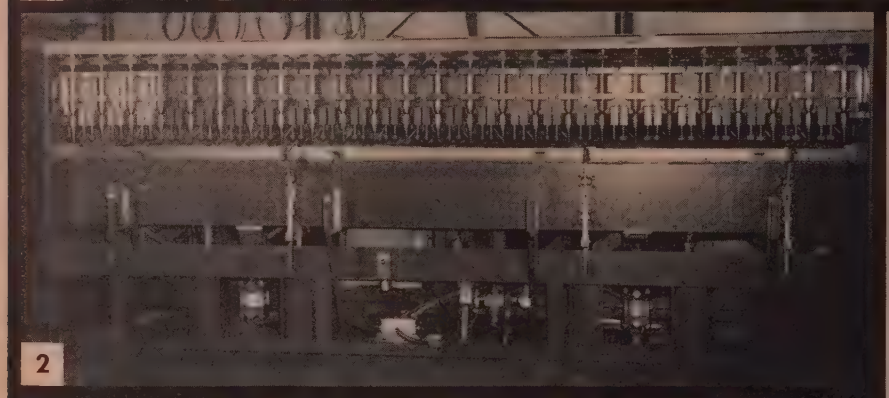
1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4

**1.** WALKING BEAM A basic appliance to speed up extrusion movement away from runout table. It's a big scrap saver, too, because manhandling of the work is all but eliminated. This type of installation frees men for jobs elsewhere in the plant. Production zooms!

**2.** MULTIPLE DRILL The extruder using this custom designed equipment is a big producer of aluminum trim. It drills and countersinks 25 holes simultaneously, automatically.

**3.** WATER MIST SPRAY Extrusions cool off quickly as they pass through the fine spray.

**4.** GRAPHITE CANISTER Gives the extrusions safe, dependable guidance as they emerge from the mouth of the press. Here's another scrap saver.

**5.** AUTOMATIC BILLET LOADER A must in any press modernization program. Clark-built loaders are engineered to your specific billet heating and extruding requirements.

**6.** EXTRUSION STRETCHER HEADS This vintage stretcher was altered to give the heads side-feeding jaws. With this jaw design, extrusions need not be jockeyed back and forth for placement as with the old front opening jaws. You can walk the work right into the stretcher. Another time and scrap saver.

**7.** EXTRUSION KNOCK-OUT Gives fast, positive disengagement from press die. Built on casters, this air-actuated device can be placed at any point along runout table. Knock-out is actuated when the container returns and hits a limit switch.

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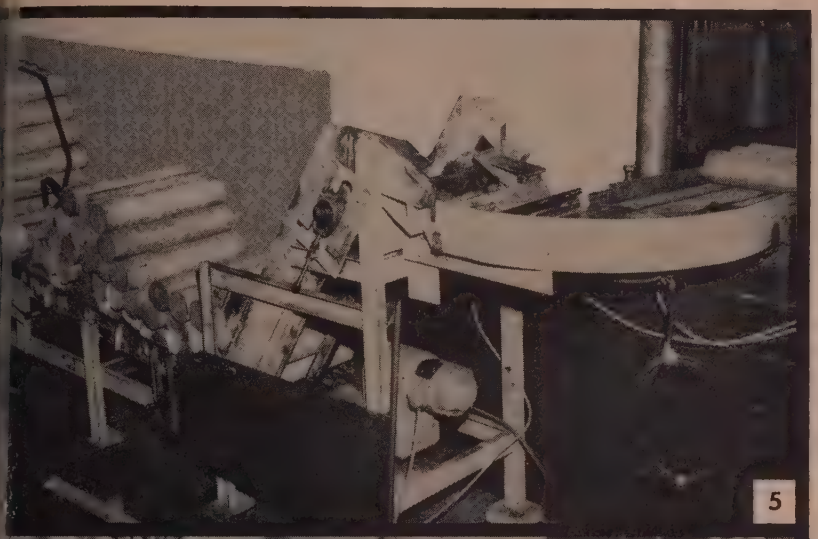
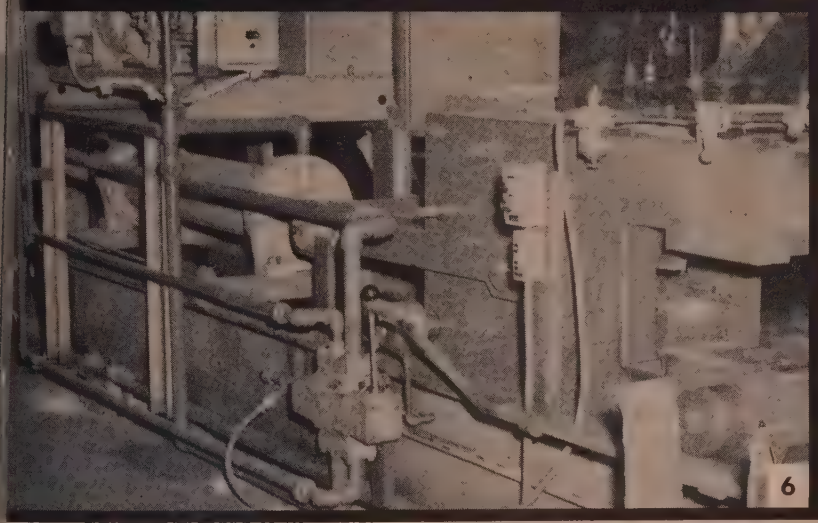
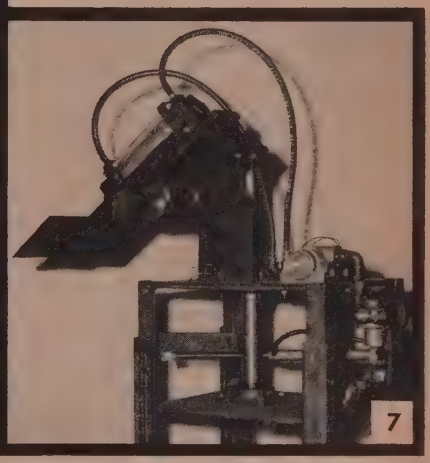



## Clark-designed Press fixtures and Appliances




● More and more, a growing extrusion industry is giving thought to the reduction of costs through **Automated** production and handling of billets and finished extrusions.

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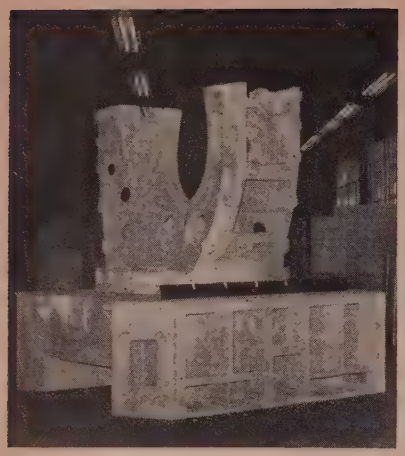

■ *The bottom base of this two-part magnesium sand casting for a missile system is the largest ever produced, according to Rolle Mfg. Co. Weighing about 1650 pounds, it measures 114 x 93 x 33 inches. The 197 cores used were contained in a foundry flask 128 x 112 x 48 inches. The yoke casting shown on top also required intricate core work.*

of ferrous and nonferrous alloys) command respectable portions of its business.

The aircraft industry pioneered the investment casting process during World War II and still calls on the foundry industry for many investment cast engine and structural components. Rolle uses the process to produce many intricate shapes with complex internal sections that would be impractical by other methods. Finish machining on such shapes is eliminated, and the exceptionally smooth surfaces and the very close tolerances allow use of the parts in the as-cast condition.

Dunkerley has noticed that Rolle's magnesium work has leveled off at 1958 volume, which approximated the '57 total. In spite of the firm's preoccupation with magnesium, he thinks that the new high strength aluminum casting alloys, notably modified A356, have given aluminum a shot in the arm. In using this alloy, Rolle always starts with virgin metal for any job.

"Perhaps we'll evolve a sound method of scrap reclamation with this alloy some day, but we're not taking chances with it now," he said.

But if Rolle's magnesium business is leveling off, Dunkerley thinks that sales have reached a temporary plateau.

"When the government freezes the missile spread, you'll see a substantial increase in the consumption of magnesium—in cast as well as wrought shapes," he predicted.

Rolle also does some chemical milling to produce large, rigid cast shapes to close tolerances (it is licensed to use the process of Turco Products, Inc., Los Angeles), and uses the Al-Fin bimetallic process to bond steel sleeves to cast aluminum or magnesium outer shells for rotor housings, etc.

Morris Bean & Co., Yellow Springs, Ohio, reports that it is being "pushed" into magnesium foundry work because of the metal's growing use in the military field; is supplying cast magnesium components for electronic controls, radar tracking devices and other military work.

"We have a pretty broad peacetime base in aluminum castings, including such items as tire molds and torque converter elements, but we're going along on the magnesium activity in view of the tremendous promise held out by the missile industry," a company spokesman said.

Gillett & Eaton, Inc., Lake City, Mich., is heavily engaged in foundry work for makers of air conditioning equipment, air compressors, machine tools and engines of all types, using practically all aluminum casting alloys.

"We were the first foundry to use a hypereutectic aluminum-silicon alloy," said C. E. Richardson, general sales manager. "The first application was in automotive pistons, but now we're using it for aircraft and radar parts as well."

## High Silicon Alloy

G&E uses its own hypereutectic alloy called Vanasil Z, reported to have a thermal expansion factor superior to that of other aluminum alloys and very close to cast iron. Besides its high heat conductivity, Vanasil has wear resistance superior to cast iron.

Gillett & Eaton has experienced a 1000% increase in its aluminum consumption since 1952, but also does considerable work in gray iron for railroad pistons and other parts. While pistons represent 30% of its aluminum castings output, the firm is trying hard to pull in other automotive jobs, particularly aluminum wheels and wheel-brake drums with steel inserts. They are also working on an aircraft wheel.

A special Gillett & Eaton product is the wire insert piston. Pre-shaped steel wire is cast in the piston wall where the top ring is located (see photo). When the groove is machined the tough wire is cut, exposing the closely spaced, hard surfaced bearing points on top and bottom faces of the groove.

"This strengthens the second land," Richardson said. "It reduces wear in the top land 30 to 50% while eliminating the heat dam behind the insert. It also allows the piston to expand. A solid insert would retard expansion."

Curto-Ligonier Foundry Co., specializing in magnesium sand castings at its Melrose Park, Ill. plant and aluminum work at facilities in Ligonier, Ind., is reported to have attained a high degree of efficiency in the production of thin-walled magnesium castings where extremely light weight is required without sacrificing rigidity and strength (see MM, March '59, p. 86).

Jerry Curto, president of the firm, notices that most military prototype work is being given to smaller companies.

"My impression is that small firms have scored with more accurate jobs than the larger firms produce," he said. "Small company management can take a direct interest in this kind of business, can get out in the shop and influence more painstaking production."

Prototypes are small order work, but no less profitable. The uncertainties of missile development and the need for fast delivery make the small shop a natural for prototype business—jobs in or around the 50-piece category, Curto said. This is particularly so in shops that have become expert in wood pattern-making, which has paid off in shorter lead times.

Curto-Ligonier uses wood patterns, can produce them for any foundry job faster than metal tooling, and come up with consistently high quality castings, however, some design requirements make it necessary to produce castings from metal pattern equipment.

The foundry industry is ingrown to a degree that makes recruitment of young talent essential for its future welfare. The company has taken steps to correct this fault.

A representative of General Motors' Fabricast Division said that the firm's foundry branch operates on a half-captive, half-jobbing basis. Diesel motor makers account for the bulk of the jobbing volume, but the division also supplies parts for aircraft, oil burners, etc.

Evidence of GM's growing interest in aluminum was the recent consolidation of the Fabricast Division and the cor-

■ *A specialty of Gillett & Eaton, Inc. is the wire insert piston. Cutaway section of photo shows how pre-shaped steel wire is inserted in piston wall to reduce wear in the top land.*

## You'll realize how much more BRIDGEPORT offers!

After you've "looked 'em all over," it's refreshing to see the special and scrupulous care Bridgeport devotes to *every* order, large or small. No other maker of aluminum extrusions and forgings offers this unique *combination* of seven prime advantages!

Bridgeport has . . . (1) the capacity of a large producer, but the flexibility and interest in your problems of a small one . . . (2) Massive extrusion capacity for no-delay deliveries . . . (3) Extensive casting facilities permitting quality control from raw materials to finished products . . . (4) Bridgeport-owned die shops employing the most skilled craftsmen, the most advanced equipment, to produce perfect dies for extrusions, hot and cold forgings, impacts . . . (5) Complete testing and inspection facilities, including ultrasonic immersion . . . (6) Widely experienced metallurgists, production and engineering people, working *full effort* on aluminum . . . (7) Research and development facilities, specializing in light metals, and adding constantly to Bridgeport's unsurpassed knowledge in this field.

Our ideas on using aluminum to *your* advantage are yours for the asking! Call your nearby Bridgeport Man if you have *anything* requiring aluminum on the drawing boards. He'll be glad to help. And if you'd like to know more about us, write today for our free booklet, Bridgeport Aluminum Extrusions. Dept. 1404.

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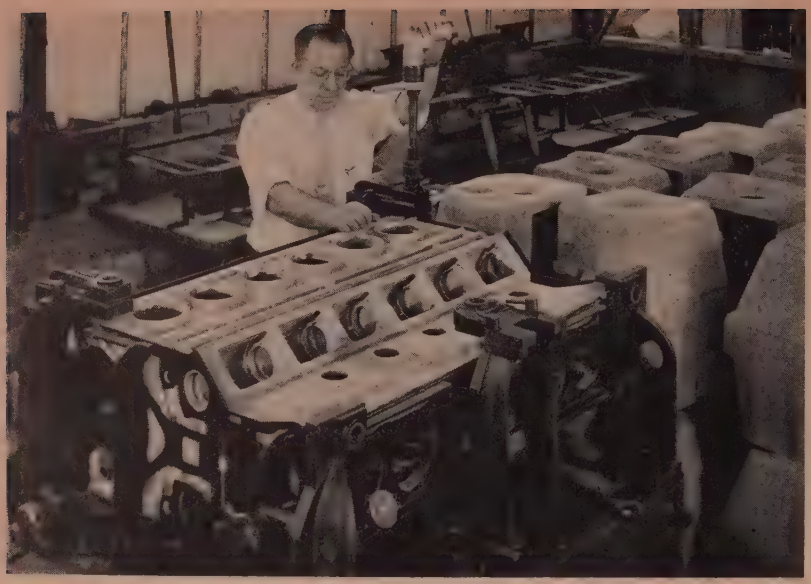


■ *Qualifying an aluminum cylinder block at Quality Aluminum Casting Co. This firm has been engaged in large truck and diesel engine cast components for 35 years.*

poration's Central Foundry Division. Hereafter, Fabricast's two foundries (Bedford, Ind. and Jones Mills, Ark.) will be designated as the Fabricast plants of the Central Foundry Division.

Buick's aluminum transmisison case is a Fabricast product, produced by the $CO_2$ process which uses a sodium silicate binder mixed with the sand. Carbon dioxide gas is used to harden the sand.

"Silica gel is the actual binding agent," the engineer said. "The advantage is that the core takes the shape of the box, producing a high degree of accuracy in the product."

The operation is performed with conventional foundry equipment, but eliminates driers and ovens.

One indication of the General Motors' increased use of aluminum is the firm's intention to start casting aluminum at the Saginaw, Mich., iron plant of the Central Foundry Division.

■ *Heat treating aluminum castings at Quality Aluminum Casting Co. to produce higher physicals.*

"Castings from one ounce to 1000 pounds" is a catch-phrase used at Quality Aluminum Casting Co., Waukesha, Wis., but the firm stressed the heavier work at its booth. Examples included exceptionally large impeller wheels for hydro-electric power plants, diesel engine oil pans, cylinder blocks for truck engines, transmission cases, and flywheel housings. The plant is also turning out components for military applications.

## More Permanent Mold

Quality Aluminum has been casting large aluminum truck engine components for the past 35 years. Today, a high degree of automatic sand and mold handling equipment is used to speed this work and hold prices down. A member of Quality Aluminum's engineering department reported increasing development of permanent mold casting at Waukesha.

Bendix Foundries, a division of Bendix Aviation Corp., Teterboro, N. J., employs all casting processes except investment. The 27-year-old firm does missile prototype work in aluminum and magnesium. Bendix now makes the magnesium outer housings of the Talos, which a company spokesman said is now operational. With things as they are, he isn't too excited about the prospects for magnesium work; "after this missile shake-out takes place. How many missiles will there be—10? 15? I wonder what this business could amount to."

On the civilian side, he couldn't see anything capable of boosting magnesium volume except, perhaps, portable tools. Bendix is also casting aluminum for launching pedestal parts for the Hawk, a missile that is expected to be operational this year.

General Electric's facility at Erie, Pa., is the only one of five Foundry Department plants doing aluminum work. Up until about 10 years ago, the Foundry Department was a captive branch. Then, the various GE departments and divisions that gave the Foundry Department its work were told that they could go to other sources for castings if they were found to be cheaper. At the same time, the foundry was told that it would have to find outside customers.

"These days, we make castings in almost all metals, shapes and sizes," a sales engineer said. "We use all alloys to produce sand and permanent mold castings. Most of our aluminum work is for military prototypes, but we've done a substantial number of industrial jobs, too. Some years back we made the 1000-pound inlet castings for the gas turbine systems of the Union Pacific locomotives."

The GE man attested to the considerably broadened range of aluminum foundry work at Erie. "By looking at the kinds of things we are asked to make, one can tell that firms are switching from other metals to aluminum," he said. "The trend for us is in the direction of permanent mold work and away from sand."

Hampden Brass & Aluminum Co., Springfield, Mass., is in a position to produce heavier aluminum die castings now that it has added two 1000-tonners to its battery of die casting machines. Hampden is also heavily engaged in sand and permanent mold casting of aluminum; brass accounts for only about 2% of its activity in these processes.

The Light Metals Department of American Brake Shoe Co. reports considerable headway with aluminum at its Mahwah, N. J. plant, while the ferrous side of the business is "spotty." Emphasis is heavy on military work, for

**Dow's C. E. Nelson**

***Newly elected president of the American Foundrymen's Society***

**Group of automotive automatic transmission valve housings and functional parts die cast in aluminum by Doehler-Jarvis Div., National Lead Co. These products are representative of the firm's work in aluminum, magnesium, zinc and brass.**

which the Division's light metals department is using Ductaluminum alloy in three analyses.

Canopy supports for the Northrop T-38 supersonic jet trainer are one example of economies gained through the use of castings. Three of these supports, cast in the high strength alloy, saved Northrop $1500 per ship. The alternative was a fabricated assembly of forgings and extrusions which would have called for greater weight, larger space and complex manufacture at an overall cost of $500 per support.

### Stress Civilian Work

But the emphasis is generally on non-military products where a job die caster is concerned, and most independent die casters are striving for diversification. The rising market for control and recording devices created by the trend toward automation has caused Milwaukee Die Casting Co., Milwaukee, Wis., to seek business in this field.

"We are trying to diversify by opening new accounts with manufacturers of control instruments of all types," an executive of the firm said. "The electronics industry is another field we intend to get into.

"As of now, we're heavy in machine parts. But with 21 machines with capacities up to 600 tons, we believe we have enough facilities to be more flexible than we are. These fields that I've mentioned are expanding and we can be instrumental in filling the gap as well as most other jobbing die casters. And the trend is more and more toward aluminum in our plant."

A spokesman for Doehler-Jarvis Division of National Lead Co., Toledo, Ohio, reported considerable developmental activity in bi-metallic bonding. As closely related as Doehler is to the automotive field, this activity is expected to bear fruit with increased acceptance of the aluminum auto wheel or wheel-brake drum. D-J's interest in bi-metallic bonding is so keen that it has started to distribute a quarterly bulletin dealing solely with this process.

At the same time, D-J is doing all it can to advance the cause of the die cast V-8 aluminum engine block. What little off-the-record comment was made at the show indicated that Doehler and Kaiser consider the matter far from dead.

Doehler's many non-automotive customers include firms such as Underwood, International Business Machines, Revere Camera, and Homelite Division of Textron Inc. The firm makes the entire frame for the Underwood typewriter and makes covers and side frames for IBM's typewriter. Doehler's Batavia, N. Y. aluminum plant produces these components. A separate plant there, devoted to magnesium die casting, produces a variety of lightweight parts for the Homelite chain saw. But Doehler's customer list totals some 1400 firms.

Meanwhile, the magnesium industry is pursuing that elusive quarry, the big civilian or consumer application. The Magnesium Association had a meeting in connection with the foundry show for the purpose of starting a broad survey of manufacturers to discover as many current applications of the metal as possible, as well as the reasons for its selection. Presumably, presentation of the entire list of uses would in time boost magnesium consumption.

"Suppose a manufacturer of specialized machinery discovered that the textile industry has successfully adopted magnesium for certain machine components in order to reduce inertia and thus cut down on maintenance," a foundryman explained. "Perhaps this would encourage him to experiment with magnesium for his own products."

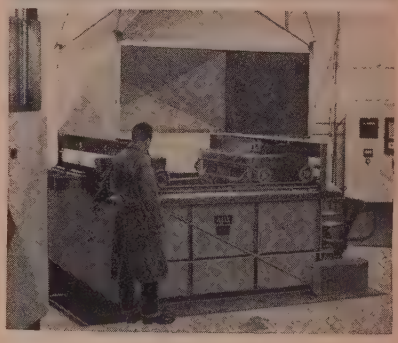
The official association of one of the nation's leading indoor sports is currently examining magnesium as a substitute for wood in an item of the game's equipment. Economic factors tend to make wood a liability these days; at the same time, performance characteristics claimed for magnesium in this application would not alter the scoring pattern—the most important factor in its adoption and perhaps the main reason why magnesium lost out when first put forward 12 years ago.

Because the sport is growing increasingly popular with Americans, adoption of magnesium would be a major breakthrough for the metal and would give the industry a high-volume peacetime product. Current experimental models are being permanent mold cast.

"You can't distinguish between the wood and the magnesium after it's painted," a metallurgist for the interested foundry said.


MERIDIAN METALCRAFT, INC.

EXPANDS OPERATION TO INCLUDE LARGEST WEST COAST DIP BRAZING FACILITY



**MEMORANDUM**

**TO:**
All Design Engineers.

**FROM:**
Process Engineering Department, MERIDIAN METALCRAFT, Inc., Whittier, California.

**SUBJECT:**
Completion of largest West Coast Dip Brazing Facility by MERIDIAN METALCRAFT, Inc., in operation since Dec. 1, 1958.

*The new facility is completely equipped for quantity production of aluminum assemblies, including large sizes used in aircraft and missiles as well as for manufacturers of consumer products such as houseware, toys, electrical equipment, tools and machinery.*

*The process permits the production of complex assemblies, impossible to produce by other methods, thereby greatly increasing possibilities available to the designer. Dip brazing enables fabricators of aluminum parts to eliminate slow and often inaccurate hand welding.*

*Dip brazed joints produced in correctly designed assemblies are from 80 to 100% as strong as the parent material. Warpage is virtually eliminated. MERIDIAN METALCRAFT, Inc., has established complete systems of safeguards and precautions for military security contracts which in no way interfere with their handling of commercial production.*

MERIDIAN METALCRAFT, INC.
8733 S. Millergrove Drive, Whittier, Calif.
WEST COAST ELECTRONIC MANUFACTURERS ASSOCIATION

# PALLADIUM
## makes
# TITANIUM . . . . MORE RESISTANT TO CORROSION

A RECENT development of the Metals Research Laboratories of Union Carbide Metals Co., Division of Union Carbide Corp., greatly broadens titanium's service potential in highly corrosive environments. The discovery represents a major advance in titanium technology, and is expected to open up many new areas of application in chemical processing.

Dr. Milton Stern of the company's Metals Research Laboratories has disclosed that as little as 0.1% palladium added to titanium makes a new alloy which is resistant to boiling solutions of some reducing acids, such as hydrochloric acid. Prior to this discovery, titanium was well known for its ability to resist corrosion in extreme oxidizing environments (for example, boiling nitric acid).

The metal now has greatly broadened applicability as a structural material, according to J. C. Douglas, Union Carbide's vice president in charge of technology. "This new alloy represents a breakthrough in the battle against corrosion," Douglas asserted.

Even before the discovery, titanium was being fabricated into pumps, valves and other equipment for the chemical industry, according to H. K. Intemann, president of the company.

"This discovery will provide the processing industries with a remarkable new material for fighting corrosion. It will result in better and longer lasting equipment, and ultimately will mean better products at lower cost," he declared.

The new alloy is expected to greatly increase the flexibility of processing equipment and greatly prolong its useful life. Also, since process conditions may unexpectedly change the environment from reducing to oxidizing, the versatility of the new alloy might be an important factor in preventing equipment failure.

Before this discovery, titanium was well known for its ability to resist corrosion in extreme oxidizing environments (boiling nitric acid or ferric chloride) and was being fabricated into pumps, valves, and other chemical industry equipment. However, in a reducing environment (such as hydrochloric or sulfuric acid) titanium was not always serviceable. For example, in a boiling 5% solution of hydrochloric acid, titanium dissolves at the rate of more than one inch per year.

This obstacle to more universal use of titanium has now been overcome by the addition of 0.1% of palladium, a noble metal of the platinum group. This addition decreases the rate of corrosive attack to less than one one-hundredth of an inch per year, which is usually considered satisfactory.

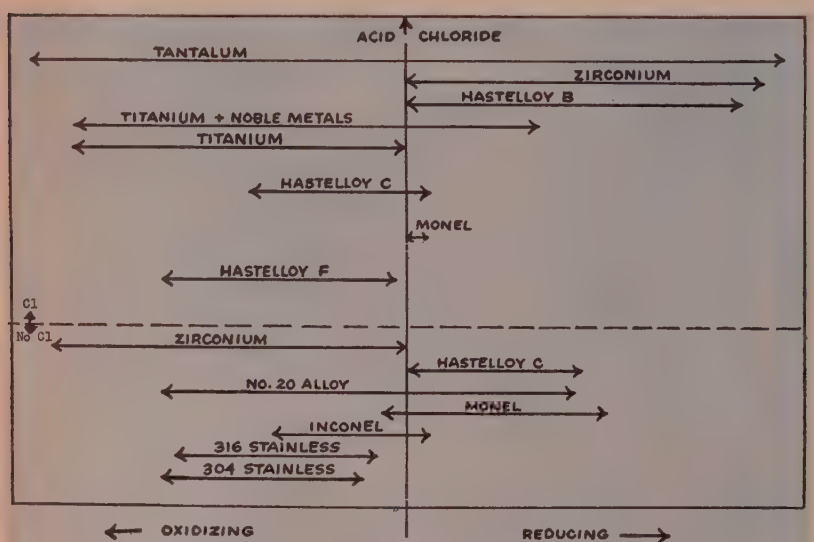
In a long series of tests, Dr. Stern also determined that this improvement in titanium's performance as a corrosion resistant metal could also be achieved by small additions of most of the other noble metals — platinum, rhenium, ruthenium, iridium, osmium, rhodium, etc.

The addition of 0.1% palladium, which was recently quoted at $19 per troy ounce, would add about 28 cents per pound to the price of titanium mill products, according to Union Carbide. Recent prices for bars, plates, sheets and wire of titanium ranged from about $4 to $14 per pound.

Tests of the titanium-palladium alloy show that its mechanical properties are identical with those of unalloyed titanium. Additions of up to 0.2% have no effect on the tensile properties (including strength and ductility) of the titanium. The tests also showed that palladium-bearing titanium can be cold and hot worked without difficulty.

The new alloy was developed after Dr. Stern had advanced an electrochemical theory for the role of noble metal additions on corrosion and passivity (the state of being chemically reactionless or inert) which was applied to the invention.

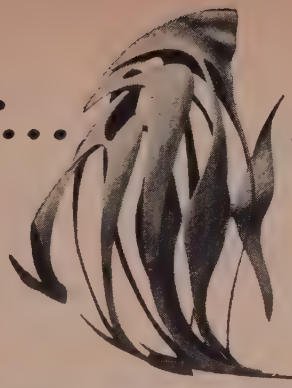
Patent applications covering this development have been filed. Union Carbide's present plans are to offer licenses to produce the alloy to titanium mill products producers who will in turn sell the new alloy to fabricators of processing equipment. Union Carbide Metals Co. will continue to produce titanium sponge, the material from which titanium mill shapes are produced, and titanium master alloys for addition to the sponge during melting to produce alloys of titanium.




■ ***Comparison of titanium and titanium-noble metal alloys with other corrosion-resistant materials. Total area represents a variety of corrosive environments. Center vertical line separates oxidizing environments on the left from reducing environments on the right. Further to the left or to the right, the environment becomes more oxidizing or reducing. This represents an increase in temperature and concentration. Moving from bottom to top, the environments show greater tendency to break down passivity illustrated by an increase in acid-chloride content. The solid lines with arrows at the end show the behavior of particular alloys. Each alloy will handle all environments below its solid line.***

THERE ARE

*shapes...*



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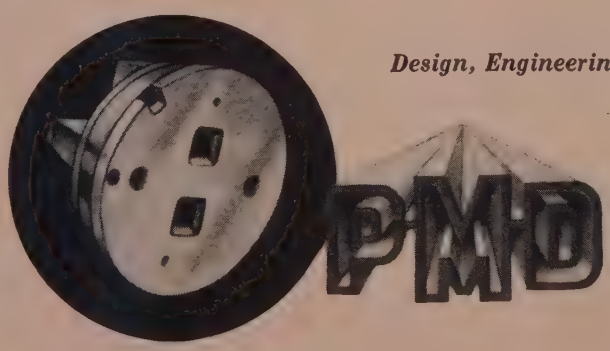


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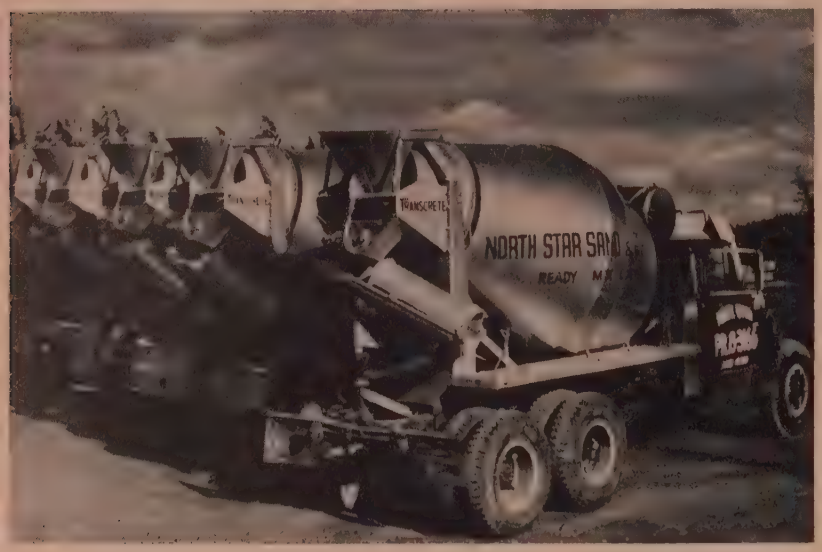


## Aluminum Concrete Transit Mixers Introduced

The first aluminum transit concrete mixers to be built in America are now coming off the production line at Construction Machinery Co., Waterloo, Ia., according to W. A. Holden, president.

The North Star Sand and Gravel Co., Seattle, and Central Pre-Mix Co., Spokane, Wash., are the first two ready-mix operators to place orders and already have fleets of CMC Transcretes in operation, Holden reported. The manufacturer's production schedules have been stepped up and plant facilities expanded to take care of the fast growing order backlog.

The aluminum CMC Transcretes are the result of several years of joint development work by Construction Machinery Co. and Kaiser Aluminum & Chemical Corp. Built of Kaiser's tough, weldable alloy 5086, the Transcretes weigh one-third less than steel models of the same size. This means a greatly increased payload, cuts down on the number of trips required to haul a given amount of concrete and provides savings in time, labor, fuel and maintenance.

The weight of a CMC 7-yard aluminum Transcrete is approximately 4600 pounds as compared to nearly 7000 pounds for a conventional 7-yard steel model. This wide margin in weight savings will be of primary importance in enabling the ready-mix industry to realize substantially increased payloads.

All parts of the Ford chassis-mounted Transcrete are aluminum except the drive train and mixer controls. The heavy-duty chutes weigh 60% less than steel chutes — which means quicker, easier handling for the operator.

The new mixers have the same basic design features as CMC's complete line of steel model Transcretes which are available in truck engine drive and separate engine drive models in 4, 5, 5½, 6 and 7-yard sizes.

## High-Purity Aluminum Marketed in All Forms

Ultra-high purity aluminum (99.992%) is a product of Aluminum Foils, Inc., 1100 Richmond St., Jackson, Tenn., marketed under the trade name Raffinal, in pig, sheet, pellets, and foil. The metal has been in production for about half a year.

Raffinal is used as a catalyst in the petroleum industry in cracking of hi-octane gasoline. Basically, in foil it is used for high reliability capacitors where the ultimate in quality is desired. The high purity of the metal adds greatly to the shelf life of the unit, T. W. Allison, sales manager explained.

The new product is very easily anodized and polished. For this reason, in sheet form Raffinal is sold primarily for decorative purposes such as eye glass frames, watch cases, automobile trim, jewelry, trays, in all gauges from heavy sheet to the light gauge coils.

"The market at the present time is small because there has never been a domestic source with substantial quantities available. We are hopeful that we can develop a market where quality is the number one factor," Allison said.

## Magnesium Containers Added to Aluminum Line

Magnesium containers for electronic and other applications are now being stocked by Zero Mfg. Co., 1121 Chestnut St., Burbank, Calif. The firm has made similar containers in aluminum for years.

The deep-drawn magnesium boxes and covers are customized as needed to fit individual customer requirements through such secondary operations as punching, louvering, dimpling and the addition of accessories. No tooling charges are included on orders utilizing boxes and covers from stock, Zero said.

Initially, Zero is stocking more than 40 sizes of magnesium containers meeting military specifications, according to Joe E. Daniels, vice president in charge of sales. Other sizes will be added later as the availability of magnesium boxes and covers becomes known, he said.

The deep-draw process Zero uses on magnesium was developed by the Zero technical staff in collaboration with The Dow Chemical Co. Zero also produces drawn magnesium boxes and covers from custom dies and fabricates large magnesium containers by welding.

## Electric Water Heater Is Durable, Rust-Free

Electric water heaters of aluminum, marketed under the National Alumidure label, are manufactured by National Steel Construction Co., 500 Myrtle St., Seattle, Wash.

The tanks are constructed of aluminum alloy with ultimate tensile strength of not less than 40,000 p.s.i., and the corrosion resistance of alloy 7072, according to National Steel. Tanks are tested to 300 p.s.i. hydrostatic pressure and guaranteed to 127.5 p.s.i working pressure.

The line includes round models with

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capacities of 40, 52, 66, 82 and 100 gallons and table top models of 40 and 52 gallon capacity. National Steel reports that the new tank is rust-free, light weight, tough and resilient.

Immersion type thermostats and heating elements may be removed without draining the tanks. Each tank is equipped with a magnesium anode. Tank insulation is 2½-inches thick. Over it is a steel jacket finished with baked enamel.

## Anodized Aluminum Grating Adorns Synagogue

Permanent panels faced with a unique architectural aluminum grating in gold anodized aluminum form a dramatic building facade heightening the religious character of the Congregation Beth El Synagogue in South Orange, N. J.

The gratings were produced by Borden Metal Products Co., Elizabeth, N. J. Brown and gray Seaporclad porcelain enamel steel panels form a backdrop.

The synagogue was honored as one of the 14 outstanding religious buildings by the Museum of Contemporary Crafts and by the Church Architectural Guild of America.

Other features of Beth El Synagogue include heating and air-conditioning via "air-flow" duct system, side walls of colored and tinted glass, band of light-giving clear glass at roof intersection, lounge walls and exterior courts of cavity brick panels separated by color glass slots, and steel-framed roof.

## Titanium Melting Process Eliminates Contaminants

A new method of vacuum melting titanium, eliminating oxygen and nitrogen contaminants, has been announced by Johnston & Funk Metallurgical Corp., Wooster, O., a subsidiary of Mallory-Sharon Metals Corp.

"The new process removes the major contaminants of oxygen and nitrogen in vacuum melted titanium ingots below 1/10 of 1% or well below the level at which embrittlement can take place," a company spokesman said.

Since oxygen and nitrogen are the major titanium ingot contaminants, the ingots are always melted in a vacuum or inert atmosphere. Vacuum melting, however, does not solve the problem of the oxygen and nitrogen contaminants within the metal itself.

To solve this problem, Johnson & Funk's research laboratory has come up with a method of arc melting titanium and titanium alloys with an electrode which contains titanium and another metal which is even more reactive to oxygen and nitrogen than titanium itself, and thus deoxidizes and denitrides the metal being processed.

In operation, a consumable electrode of titanium and a small percentage of the contaminant-removing metal are placed in the furnace well. As the electrode heats, the second metal boils off at about 1500°C., somewhat below the boiling point of titanium. The resulting gas expands around the arc, combining with the oxygen and nitrogen in the titanium.

The resulting oxides can be drawn off by a vacuum since they are insoluble in titanium, stable at high temperatures and highly volatile. They will not recombine with the titanium.

Johnston & Funk metallurgists have found at least two materials which can serve as the de-contaminating agent; and the process is now in use in the arc melting of 12-inch diameter titanium ingots in the vacuum melt facilities at the company's main plant, located on West Kemrow Ave., Wooster, Ohio.

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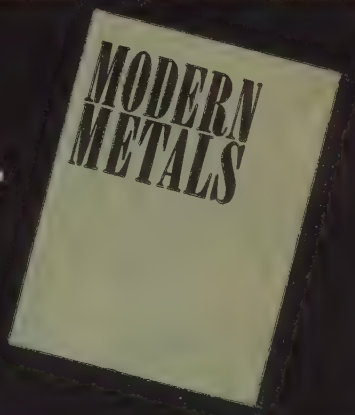


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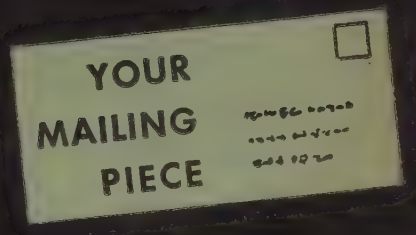
2. DIRECT MAIL.....

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**Case B** — A recent mailing by a maker of colored aluminum coil brought a 9% return. Their comment: "A very effective mailing list . . . Replies are still coming in."

**Case C** — From a mailing of 10,000 letters, an aluminum foundry received 1,700 replies. Comment: "Total inquiries will exceed 20%, and some good business has already resulted."

**Case D** — An aluminum anodizing plant recently made a mailing of 6,500 pieces, and received 130 returns within two weeks. His comment: "We have already added seven new accounts, three of which are big volume customers."

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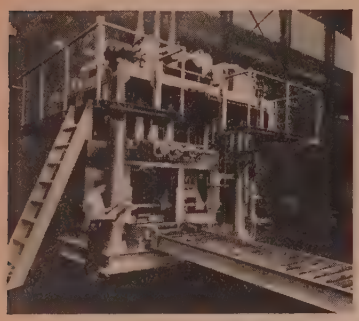

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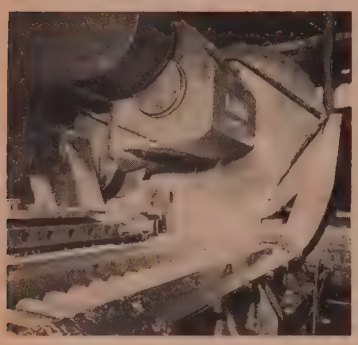
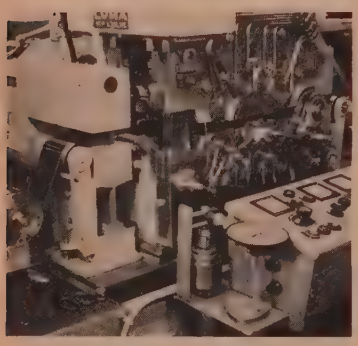


CIRCULAR SAWING MACHINES



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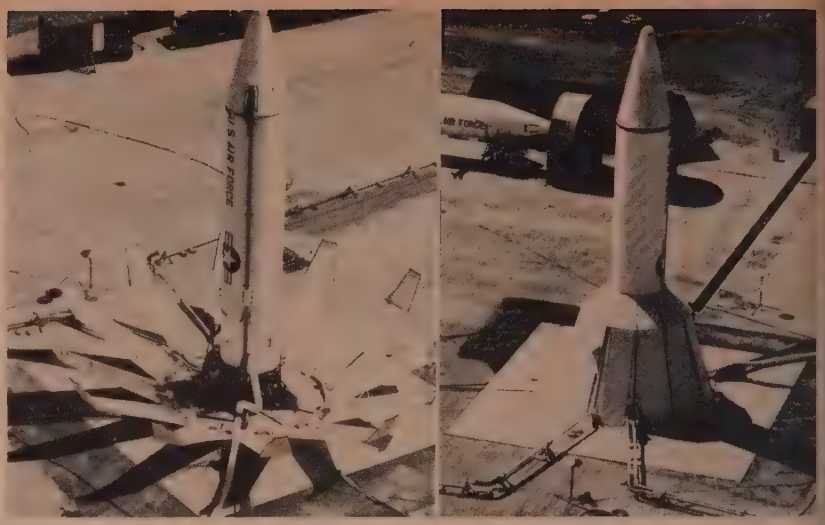


## Unique Aluminum Shelter Houses Jupiter Missile

A shelter constructed of twelve 30-ft. aluminum panels that open like the petals of a flower has been developed for use with the Jupiter intermediate-range ballistic missile, by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va. The shelter is made from 61S rigidized aluminum with skin thickness of .032-inch. It has honeycomb panels 1-1/16 in. thick set in a frame making a complete panel.

The weatherproof shelter is designed to cover the lower portion of the rocket, creating a water-tight seal that protects equipment until the rocket is ready to be fired.

After installation, the twelve 30-ft. aluminum panels radiate in a circle around the missile. When preliminary adjustments are completed, synchronized motors raise the panels, closing them around the rocket. When the missile is ready for firing, electronic equipment takes over, causing the panels to open up and return to the ground.

Doors in the 30-ft. sections allow for the entrance of workers, and other openings carry fuel lines to the missile. The interior of the shelter is coated with a paint capable of resisting temperatures of over 1000° F. Engineering firm of Barnes and Reinecke, Inc., Chicago, Ill., holds the principal Army contract for production.

## Aluminum Production in '58 Was 7% Below '56 Record High

Despite a 19% increase in primary aluminum production capacity in the U. S. during 1958, construction is proceeding on new facilities which are expected to be completed this year. Domestic capacity would then exceed 2.6 million tons, according to a Bureau of Mines report.

At the same time, domestic production in '58 was 1,566,000 tons, down 5% from 1957 and 7% below the record high in 1956 (1,678,954 tons).

Projects under way include Alcoa's new 150,000-ton plant near Evansville, Ind.; Reynolds' new 100,000-ton plant near Massena, N. Y., and potlines being completed by Alcoa at Point Comfort, Tex., Kaiser at Ravenswood, W. Va., and Ormet at Clarington, Ohio.

Preliminary estimates indicated that there was a small increase in world production of primary aluminum in 1958. Production from the new Canadian plant of Canadian British Aluminium Co., Ltd., added to Alcan production, resulted in a slight increase in production in Canada over the previous year, but was not sufficient to offset the decline in the U.S., and total output for North America in '58 was slightly below that of '57. Production in Europe and Asia increased about 5%.

Preliminary data indicate that general imports of aluminum in 1958 were 284,000 tons; up about 17% from 1957. This included 256,000 tons of metals and alloys in crude form and 28,000 tons of semifabricated shapes.

Canada supplied 84% or 214,000 tons of imported crude aluminum, 22,000 tons were from Norway, 12,000 tons from France, and 8,000 tons from other countries.

Belgium and Luxembourg supplied 9000 tons of the 28,000 tons of plates, sheets, bars, etc. which were imported. Receipts of semifabricated shapes from Italy totaled about 4000 tons; and Canada and France each shipped about 3000 tons. West Germany and Japan each supplied 2000 tons, and the United Kingdom 1,800.

Exports of 64,000 tons of crude metal and semifabricated shapes represented a gain of 49% compared with 1957.

## ynolds Introduces New il Gift Wrap Line

A complete year-round line of aluminum foil gift wraps was introduced in January by the Decorative Foil Division Reynolds Metals Co.

Artists were commissioned by Reynolds to create more than 90 original wraps in the new "Designs for Giving" line. The line is produced in lengths ranging from 48 inches to 24 ft., and prices varying from 50 cents to $2.75.

Reynolds' goal is a "competitively priced collection of luxurious, individually expressive wraps that can be merchandised and heavily advertised to an expanding gift wrap market every month of the year."

Reynolds staged previews of the new collection at three department stores in November and December. The Marston Co. in San Diego, Calif., Buffums' in Long Beach, Calif., and Thalhimer's in Richmond, Va., reported that enthusiastic customers bought at an "amazing" rate.

## ilmore Heads Dow's New Magnesium Sales Group

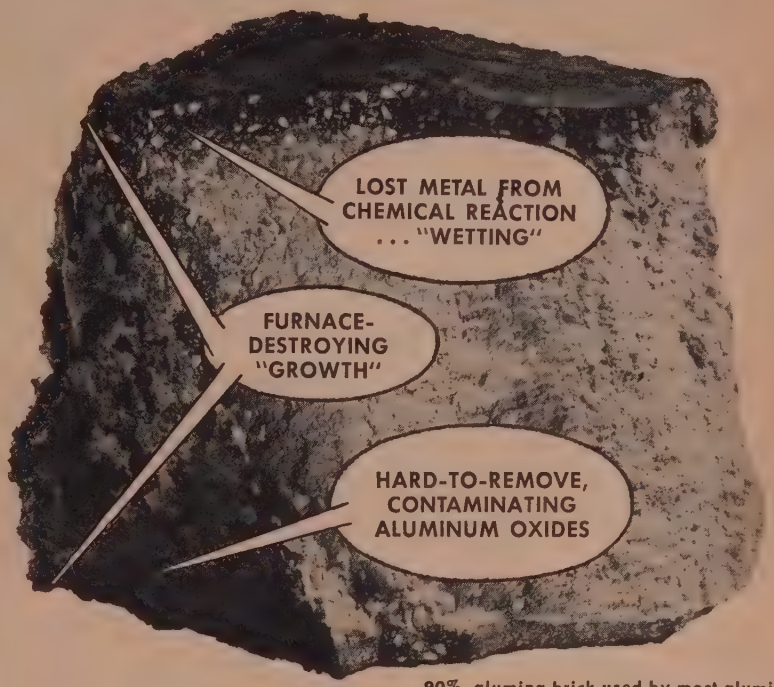
The Dow Chemical Co. has reorganized its magnesium sales department to two separate groups. Donald K. Allman, the company's director of sales, said the change will permit greater concentration of effort in specialized markets.

Henceforth Dow magnesium sales will be divided between a Metal Sales Department, which will specialize in the sale of primary metal, alloy ingot and cast anodes, and a Magnesium Products Sales Department, which will concentrate on the sale of sheet, extrusions, rod and die castings and fabricated products.

William S. Loose, who has been sales manager for all Dow magnesium products for the past 10 years, will be manager of the Metal Sales Department. The Magnesium Products Sales Depart-


ALUMINUM REMELT FURNACES:

# Porter "Multex-85" avoids these refractory problems in lower sidewalls and bottoms . . .

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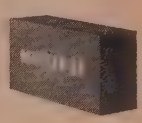

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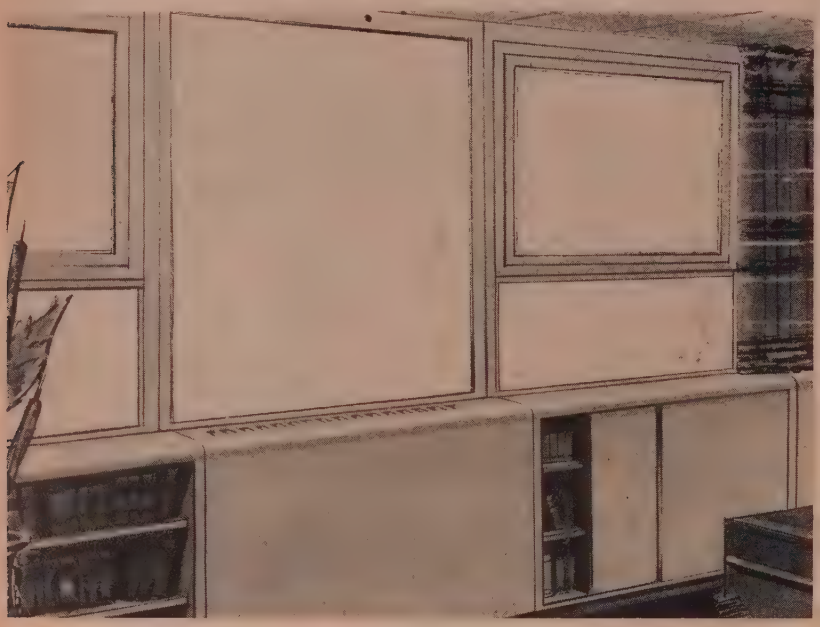
ment will be headed by Donald H. Gilmore (pictured) formerly manager of the company's Pittsburgh sales office since its establishment in 1957.

"We feel that stepped-up sales efforts in the various magnesium markets can be implemented best by dividing our product line into groups with separate sales departments responsible for each of these groups," Ballman explained.

He said Dow anticipates that substantially larger quantities of magnesium alloy ingot will be going to the automotive and appliance industries. The company also foresees expanded markets for magnesium wrought products and castings in aircraft, missiles and consumer products, he said.



## Curtain Walls Feature Built-In Air Conditioning

Separate construction for air conditioning is eliminated by a unique new curtain wall manufactured by the Michael Flynn Manufacturing Co., 700 E. Godfrey Ave., Philadelphia 24, Pa. Air conditioning units are an integral part of the Lupton curtain wall panels. Only an electrical connection is required to operate the air conditioning unit.

Lupton panels are installed exactly like conventional curtain walls, and have the usual advantages of curtain walls including ease of installation, space savings, and architectural attractiveness.

Two types of conditioners will be interchangeable in the walls: a heavy-duty conditioner; and a lighter unit. The manufacturers are studying the production of similar units to provide year-round conditioning, both heating and cooling.

## Fly Cutter Reduces Skin and Spar Milling Costs

A new two station positive rake fly cutter, designed for skin and spar milling applications, particularly for aluminum forgings and castings, has been announced by Futurmill, Inc., 6360 Highland Rd., Pontiac, Mich.

The manufacturer claims that tool inventory costs in plants can be cut drastically, since extra cutters are not needed to maintain continuous operation. The cutter reduces machining costs because it eliminates down time for cutter grind and saves tearing down and rebuilding job set-ups.

A simple blade setting gage that locks on side of cutter controls the width of cut and permits operator to set the blades in the exact position without removing cutter from spindle.

The cutter is dynamically balanced and does not require rebalancing after indexing or replacing blades. Wedge holding power has a safety factor of 300% on a 14-in. cutter at 3600 r.p.m.

Solid carbide indexable blades remove the problem of brazing strains, Futurmill said. The parallelogram blades permit cuts to a 90° shoulder and the case hardened, patented wedge behind the blades gives full chip clearance.

Futurmill fly cutters are used for parallel, plunge or gang milling operations, in single or multiple diameter applications. The manufacturer reports they are particularly successful in machining aluminum forgings and castings such as air frames, aircraft and missile components..

## Neodymium Could Boost Magnesium Missile Usage

Neodymium, an exotic metal, is now being produced in industrial quantities by Research Chemicals, a division of Nuclear Corp. of America, Burbank, Calif. Produced to 98-99% purity, the metal appears capable of increasing the heat resistance of magnesium for aircraft and missile applications, and may have application in steel and aluminum alloys as well.

One of the more abundant rare earths, neodymium has, until now, been commercially available only as an oxide or salt. Quantities of the pure metal successfully produced were so small that detailed study of its properties and potential applications was impossible.

Misch metal, naturally occurring mixture of rare-earth oxides, has been used since the early 1950's in magnesium alloys. Dow Chemical Co. recommends it for use where temperatures of 300 to 500°F. are encountered. Above this range, however, their resistance to creep drops rapidly.

According to Nuclear Corp., experiments suggest that the good qualities imparted to alloys by misch metal are due to the neodymium in the mixture, while the undesirable qualities are caused by the other components. Cerium, for example, is known to decrease creep resistance.

It is possible that neodymium metal used alone could offer higher heat resistance without the disadvantages of misch metal's other components.

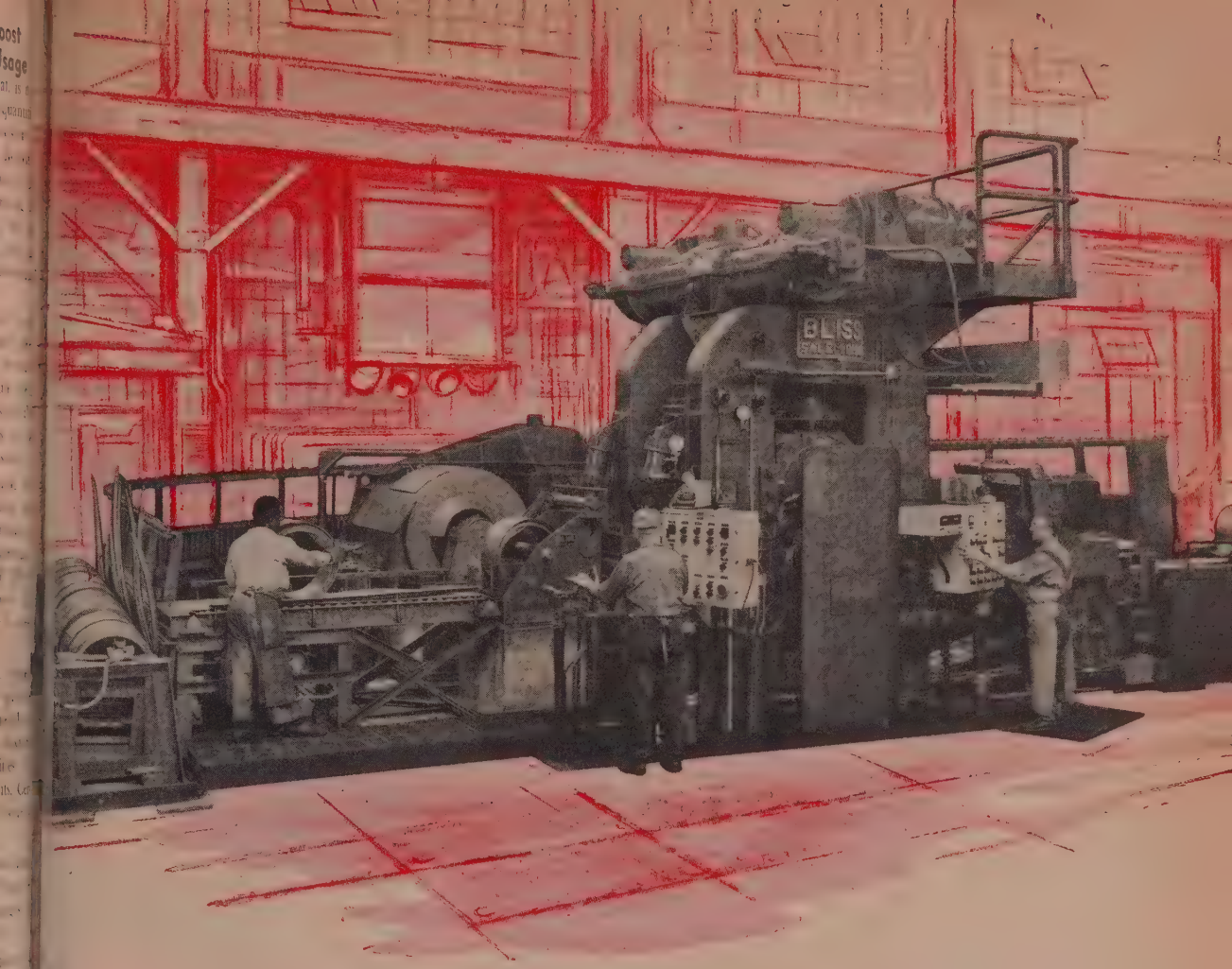
Neodymium has a melting point of over 1800°F. and a boiling point of over 5400°, properties which may prove useful in industrial applications other than alloying.

## Bridgeport Brass Might Buy Into Mallory-Sharon

Bridgeport Brass Co. has acquired a five-year option to buy a one-fourth interest in Mallory-Sharon Metals Co., producer of titanium, zirconium and other special metals. Mallory-Sharon is owned one-third each by P. R. Mallory & Co., Sharon Steel Corp. and National Distillers & Chemical Corp.

At the end of 1958, total assets of Mallory-Sharon amounted to $64.7 million while net worth was $36 million. Should Bridgeport Brass exercise its option, it would not be buying any existing Mallory-Sharon stock; rather it would be putting into the business what amounts to new capital, a National Distillers official said.

Bridgeport reported that it had signed an agreement with Mallory-Sharon whereby Mallory gets metallurgical consultation and the use of fabricating facilities in return for the option.




**IOW TO ROLL MORE FOR LESS:**

# 'eplace three-and-a-half old-timers with one really modern mill

The recently-completed modernization program at H. K. Porter Company's Riverside-Alloy Metal Division has doubled the plant's capacity of specialty non-ferrous alloys with essentially the same work force.

A central unit in the modernization is the Bliss 4-high intermediate mill shown here. According to Riverside, this single new mill provides greater production than the three old mills it replaces—a fourth old mill is still used to some extent, hence the three-and-a-half figure. Equipped with a run-around roller conveyor, the new mill coils metal on the first pass from ½-inch bars; returns the coils automatically to the entry side for further passes. Former practice was to roll flat for four or five passes before coiling.

Riverside reports that the new equipment will pay for itself in the short space of a few years. It's an outstanding example of the way a well-planned improvement program . . . plus Bliss rolling mill equipment . . . can bring new economy and efficiency to metal rolling. For other examples, write us today for a complimentary copy of our new 84-page Rolling Mill Brochure.

BLISS
SINCE 1857

*Bliss is more than a name . . . it's a guarantee*

**E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio**

**Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio**

## l-Aluminum Reefer Car Exceeds Test Expectations

Tests of the world's first all-aluminum rigerator car are proving that aluum is the coming metal for the conuction of railroad cars, according to minium Limited, Montreal.

The firm announced last October that r aluminum cars were being deliv- d to Canadian National Railways that the fifth would be subjected the most extensive test program ever dertaken on a railroad car.

The car was equipped with strain ges and put through a series of static s, in which various loads were applied to the floor and overhead meat racks. Normal maximum load limits were exceeded.

Road tests recorded stresses at up to 80 miles an hour and during the frequent impacts which happen during freight train operations. The stress during four 350-mile runs was found to be less than that provided for in the design of the vehicle.

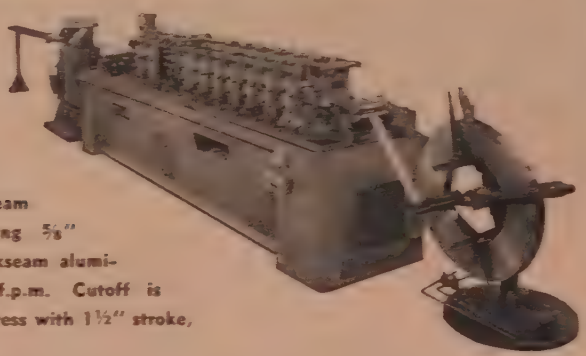
Crash tests, conducted on an incline at Kingston, Ontario, provided impacts up to 750,000 pounds.

The refrigerator car was stationed on the track with wires leading from strain gauges in the car to oscillographs in a test shack nearby. The "strike" car, a 70-ton aluminum open hopper car loaded to 210,000 pounds, was allowed to bang into the refrigerator car at speeds ranging up to seven miles an hour. The refrigerator car came through undamaged.

In a fatigue test of the car body and underframe, an oscillating jack under the center sill shook the car up and down for hours, to squeeze ten years of use into four months of testing.

Results of the tests indicate that the car will stand up better than its designers hoped, according to Aluminium Ltd.


AMERICAN ROLLER DIE CORP.
ARDCOR HIGH PRODUCTION ROLL
FORMING MACHINE FOR ALUMINUM SHAPES



his Model SF Lock Seam
ube Mill is forming 5/8"
.D., .016" wall lockseam alumium tube at 120 f.p.m. Cutoff is
RDCOR Model 10 Press with 1½" stroke,
0 strokes per min.

The new small Model SF ARDCOR Machine features: High production speeds; spindles 1.5"; new style rugged base with tool compartment and slanted front recessed for better operator stance; special narrow side roll stands with close 10" horizontal centers; fixed spur gears; quiet running all V-belt drive; low voltage protection. Basic machine readily converted to a Cold Roll Forming Machine.

ARDCOR Roll Forming Machines and Lock Seam Tube Mills are available in seven standard sizes; other sizes to customer specifications.

If your products can be cold roll formed, ARDCOR engineers can supply advancements in design and machine construction to produce them better . . . at greater speeds and profit.

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29510 Clayton Avenue Wickliffe, Ohio

DESIGNERS, ENGINEERS AND BUILDERS: Single Roll Forming Machines or Completely Automated Production Lines for Cold Forming, Formed and Non-Formed Electric Weld and Lock Seam Tube Mills • Forming Rolls, Tubing and Pipe Rolls • Straightening, Pinch and Leveller Rolls • Cut-Off Machines • Slitters

## Tube Maker Installs Water-Cooled Furnace Doors

Water-cooled doors for aluminum melting furnaces effect sound economies and better working conditions for plant help. The specially designed furnace door and companion frame pictured is one of five door assemblies recently installed by Channel Master Corp., Ellenville, N. Y., in its aluminum melting, billet casting, extrusion, and tube drawing facility. Channel Master is one of the largest manufacturers of TV antennas and aluminum tubing.

Designed and fabricated by Blaw-Knox Co., Pittsburgh, the paneled doors measure 5-2/3 x 4-2/3 feet. Outside dimensions of frames are 6 ft., 5 inches x 6½ feet, while inside measurements are 5 x 4 feet.

Maurice Roberts, Channel Master works manager, says the doors — which do not warp or crack — provide a tighter furnace seal. Just one of many improvements in working conditions is illustrated in the picture — showing John B. Holotik, first shift foreman, visually inspecting the 63 ST alloy aluminum heating process.

Chlorine gas eliminates air bubbles

the oil-fired melting furnaces. Hot tal from the furnaces is poured into C. casting units to produce many s of billets. The billets are extruded a 2000-ton extrusion press to be med into aluminum tubing.

## ast Baking Core Binder as Good Green Strength

Particular interest by foundries pro- cing aluminum, magnesium, malle- le, light-weight grey iron, brass, and onze castings is being shown toward lmirez UP-15, a new compounded ea resin powder binder. The material is developed by the research labora- ries of Archer-Daniels-Midland Co., deral Foundry Supply Division, Cleve- nd, Ohio, for conventional or dielec- c-baked cores.

UP-15, the newest resin in the ADM ne, affords a combination of perform- ice characteristics and economies lieved to be unique in the foundry sin field. High collapsibility, excellent een strength, lack of stickiness and st baking are features inherent in the w compound. Storage life has been ld-proven to be in excess of one year.

built-in color indicator helps de- rmine length of the mixing cycle. nds coated with the new resin can e blown or rammed. Admirez UP-15 expected to be popular with workmen nce the evolution of gas and the ex- nt of objectionable odor are negligible.

## Band Saw Has Broad Cutting Range

Equipment for heavy duty or contin- ious production cutting is being pro- luced by the Lockformer Co., 4615 W. Roosevelt Rd., Chicago 50, Ill. The Lockformer 24S band saw is equipped with carbide blade guides, and built-in, lifetime lubrication among other fea- ures.

"Because it uses three 14-in wheels in- stead of the two conventional 24-in. or 26-in. wheels, the Lockformer 24S band saw incorporates a full 24-in. throat yet takes up but a fraction of the space needed by a two-wheel model of similar throat capacity," a company representative said. A 13½-in. throat model is also available as well as a complete line of blades.

Speeds of 100, 600 and 3,000 fpm are attained by simple belt transfer without the power loss involved when mechanical speed reducers are employed. The final drive is by friction-free, non-slip chain and sprockets. Speeds indicated are adequate for anything from the cutting of stacked light gauge sheet metal to friction cutting of stainless steel.

## Can Maker Launches Line Of Impacted Containers

Cold extruded seamless aluminum shipping containers are a new product of Clarke Can Co., Inc., Philadelphia 25, following installation of a 495-ton Herlan horizontal impact extrusion press.

Clarke buys high purity aluminum slugs, 3-in. diameter, ⅜-in. thick for the production of the 3-in. diameter, 13-in.-long cans for welding rod and other types of packaging. Production speed is reported to be in excess of 2500 slugs per hour.

Auxiliary equipment in the fully automatic line, accurately trims the ex-


*A giant step forward in the manufacture of Carbide Tipped Saw Blades*

HEINEMANN'S

• GOLD-DOT •

CARBIDE-TIPPED SAW BLADES

*For All Non-Ferrous Metals*

The insertion of copper discs at the base of each expansion slot on the Gold Dot Saw has solved many problems which have plagued the users of carbide saws.

These discs give you a saw that is noiseless, vibrationless, smoother cutting, highly resistant to crackage.

Custom made from the highest quality steel and carbide available. Perfectly balanced, sharpened and tensioned.

Available in sizes from 4" to 36" diameter, any tooth spacing and thickness.

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HEINEMANN METAL SAWS

*FEATURING*

• VACUUM LUBRICATION HOLES • SPECIAL STEEL
• EXPANSION SLOTS • EXPERTLY HARDENED
• RADIAL MICRO-GROOVE GROUND

*With Vacuum Lubrication Holes for Cutting All Non-Ferrous Metals*

Vacuum holes distribute lubrication evenly — teeth properly formed for fast chip removal and free cutting — ground to exact tolerances — double tempered — just a few of the many reasons Heinemann Metal Saws are so widely accepted for the cutting of aluminum, copper and all other non-ferrous metals.

Available in diameters from 5" to 24". In thicknesses from 1/16" to 3/16". Either straight sharpened, bevel sharpened, or triple chip sharpened.

Just write today for complete details on our quality saws.

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HEINEMANN SAW CORPORATION

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Outstanding opportunity for qualified man with rapidly expanding Philadelphia company. Complete charge of maintenance department.

Excellent starting salary with all benefits. State complete background.

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## AUTOMATIC BELT SANDING MACHINE FOR SALE

Manufactured by Curtiss Machine, 1957. 8 inch belt sander equipped with misting device and mist collector. Set up with tank for wet spray, pump not included. Machine used for approximately two months. Perfect running condition. Address all replies to:

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1685 Dixwell Avenue
Hamden, Conn.

Lots of new business from light metals fabricators and manufacturers is obtained through half-column advertisements like this.

And the cost is sure low — only $65 per insertion on an annual basis.

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**Dick Pulliam**

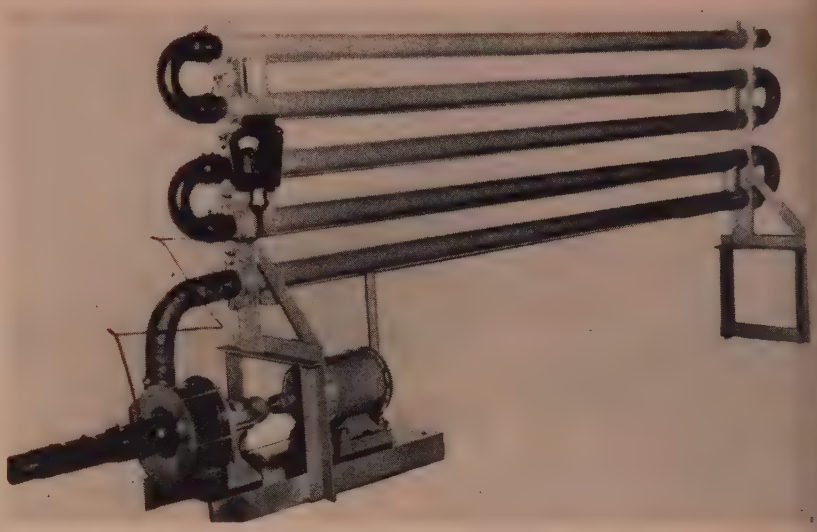
**MODERN METALS**

Tribune Tower

Chicago 11


truded cans to length and performs a variety of secondary forming and finishing operations to specifications.

"In adding inexpensive lightweight rust resistant aluminum cans to our already successful line of conventionally made tin-plate cans, we now have an extensive range of shipping containers to offer industrial and military customers," a Clarke executive said.



## Units for Cooling Acid Won't Corrode

Camac sulfuric acid anodizing solution coolers, in a range of sizes from 36,000 B.T.U. to 5,000,000 B.T.U. capacity, are being produced by Carl Buck & Associates, Essex Fells, N.J.

The equipment, designed and built specially for sulfuric acid anodizing and hardcoating, is guaranteed against attack. Exchanger tubes are made of high heat transfer graphite and the pump is acid proof plastic.

Fittings are made of molded rubber. No metallic parts come in contact with acid. The Camac cooler units are available with or without the temperature controller.

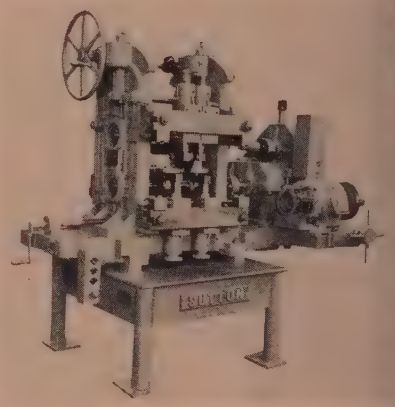
The unit pictured is typical of the "J" series.

## Machine Corrects Contours To Close Tolerances

A new contour correcting machine developed by Sutton Engineering Co., Pittsburgh 22, corrects cross-sectional distortions of aluminum extrusions to extremely close tolerances. Flat sections up to about 14 inches wide can be handled and multiple corrections of shapes circumscribed by a 9 inch circle can be made in one pass.

Extreme versatility has been incorporated in machine design to accommodate the many different cross-sectional distortions that occur in the extrusion and heat treatment of today's complex shapes.

Correcting mechanism consists of two main-drive spindles with rolls, which may be used for correcting as well as traction, and up to eight correcting idler rolls, which may be positioned in many different ways on as many as twelve tool holder positions. An almost infinite variety of shapes can be arranged for, Sutton reports. After initial set-up, tool holders may be adjusted externally, both vertically and horizontally to apply increased or decreased pressure. This feature cuts set-up and change-over time considerably and permits far more precise correcting than otherwise would be possible.



A recent typical application is by an aluminum extruder to eliminate the need to purchase certain difficult finished shapes required to complete assemblies of aluminum doors and windows. In this installation, the main drive spindle rolls are driven by a 3 h.p. single-speed motor using a variable-speed

elt drive for a 3 to 1 speed range.

Sutton contour correctors are made in various sizes and capacities and multiple stands may be used if required. Shapes of all modern metals can be corrected.

## Men-on-the-move

Ekco-Alcoa Containers Inc., Wheeling, Ill., has appointed **Robert Tooker** manager of product sales. He joined Alcoa's Atlanta sales office upon graduation from Gettysburg College in 1952, but for the past four years has been a member of the Package Development staff at New Kensington, Pa.

**Edmund S. Murrah** has been named director of engineering of the Rolling Mill Division of Morgan Construction Co., Worcester, Mass. He has served in various engineering capacities since joining the firm in 1945. In other moves, **John H. Hitchcock** was appointed chief consulting engineer for all divisions. He had been chief mechanical engineer of the Rolling Mill Division.

**Roger Kinnicutt, Jr.** and **William J. Hill** have been appointed assistant chief engineers at Morgan to serve under Murrah. Both men had been project engineers. **Bernard L. Burns** has been appointed manager of a newly formed department designated as the Design and Development Department. A veteran of Morgan, he had held the post of assistant chief draftsman. Morgan Construction Co. designs and builds rolling mills, roll neck bearings, combustion control systems, wire machines and ejectors.

Mallory-Sharon Metals Corp., Niles, Ohio, announced the appointment of **C. L. Megargle** as eastern sales manager for titanium. He will supervise all titanium sales activities for the company in the eastern U. S. and will concentrate on sales to aircraft and missile manufacturers in that area. Megargle comes to Mallory from Tube Reducing Corp., where he had been sales manager.

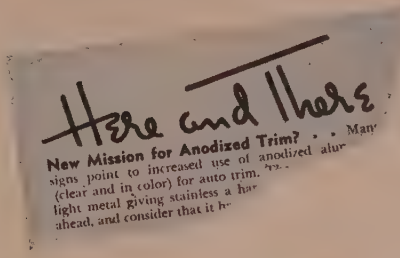
**Edward D. Mesta** has been named assistant sales manager of Mesta Machine Co., Pittsburgh. A graduate of Carnegie Institute of Technology, he served in the machine shops, inspection department, engineering department, and was advertising manager and sales engineer prior to this appointment. In other moves, Mesta Machine appointed **Richard L. McIlavy** manager of machinery sales, and **John M. Edwards** assistant to the sales manager.

**Arthur F. Earle** has been appointed secretary of Aluminium Limited Sales, Inc., New York. Dr. Earle has served Limited in various executive capacities in Canada and abroad.


# Does anybody read the book?

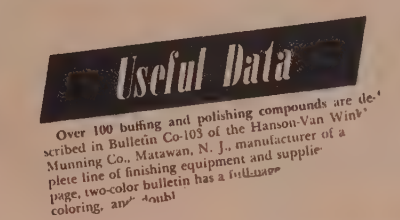
THE ANSWER to this question is of vital concern to every industrial advertiser, for it determines whether his message is getting through to the reader; whether he is getting maximum mileage out of his advertising dollar. Without an attentive audience, the advertiser's message goes unseen, unheeded.

The editorial departments of **MODERN METALS,** as well as the feature articles in this issue, are well calculated to capture and keep the reader's attention.


Here and There

**New Mission for Anodized Trim?** . . . Many signs point to increased use of anodized alu- (clear and in color) for auto trim. . . . light metal giving stainless a har- ahead, and consider that it h-

**HERE & THERE: Notes and comments on significant developments on the light metals scene. Often in a light vein, but factual, provocative.**


Useful Data

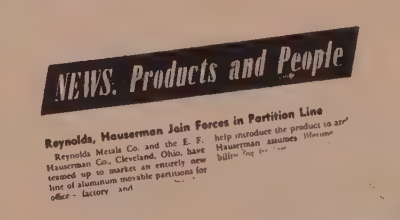
Over 100 buffing and polishing compounds are described in Bulletin Co-103 of the Hanson-Van Winkle Munning Co., Matawan, N. J., manufacturer of a complete line of finishing equipment and supplies. Page, two-color bulletin has a full-page coloring, and doubl-

USEFUL DATA: New brochures, booklets, etc. on new equipment, processes, materials, services of direct interest to light metals users.

New Enterprise

Olin-Mathieson Chemical Corp., Electrical Division is marketing Jet-Spot, **aluminum bodied flashlight** which features the industry's largest transpa- ring. Designed so it

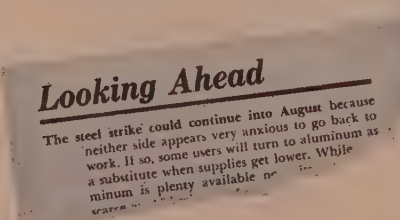
**NEW ENTERPRISE: Succinct news briefs covering new and significant product and process developments concerning light metals.**


NEWS. Products and People

**Reynolds, Hauserman Join Forces in Partition Line**

Reynolds Metals Co. and the E. F. Hauserman Co., Cleveland, Ohio, have teamed up to market an entirely new line of aluminum movable partitions for office - factory and help introduce the product to arc- Hauserman assumes lifetime billin- for

NEWS, PRODUCTS, PEOPLE: No puffs; strictly news of value and interest to readers. New products, equipment, materials, services, industry trends.


Looking Ahead

The steel strike could continue into August because neither side appears very anxious to go back to work. If so, some users will turn to aluminum as a substitute when supplies get lower. While minum is plenty available no- scarce-

**LOOKING AHEAD: Analysis of current developments, what they mean to light metals users. Keeps readers a step ahead of trends.**

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**MODERN METALS**

**435 N. Michigan Ave. Chicago 11, Ill.**

## Collapsible Aluminum Boxes Economize on Space

Economy and efficiency are both served with these new collapsible aluminum lug boxes manufactured by J. M. Gordon Co., Inc., Glendale, Calif. The erected box measures 20½ x 12-inches and is 12-inches deep. It collapses to a 3-inch height when not in use.

Seven empties are stacked in right of photo above. Folding and unfolding of lugs is accomplished with simple, quick hand motion. J. M. Gordon also makes a 24 x 17½-in., 14-in. deep model. Both can be used for a wide variety of packaged items or produce.

## Aluminum May Be Ideal Nuclear Barrier Material

Aluminum has displayed an unexpectedly good resistance to corrosion by hot sodium, according to a progress report on the Sodium-Deuterium Reactor. A research program on the SDR is being conducted for Nuclear Development Corp., White Plains, N. Y., in connection with the Atomic Energy Commission's power reactor demonstration program.

At 16 hours' exposure to a sodium jet at 950° F., .06-inch thick aluminum showed no corrosion. These findings have led NDA to consider aluminum a barrier material between the heavy water moderator and the steel tubes which contain the uranium fuel elements and the sodium coolant. The reactor core consists of a lattice work of fuel element-coolant tubes extending through a closed tank of deuterium, or heavy water, which serves as moderator.

The barrier between fuel tubes and moderator is an additional precaution to prevent sodium from mixing with heavy water in the unlikely event of a failure. Moreover, since the deuterium itself is enclosed in an aluminum vessel the walls of this vessel can now be considered a second strong barrier against the possibility of mixing coolant and moderator.


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for precision cutting of plates and sheets of all sizes up to 6" thick

NOW, good clean cuts within tolerance for nonferrous metals

For cutting aluminum, bronze, micarta, copper and other nonferrous metals . . . adaptable to individual requirements, yet provides economy of operation . . . satisfies rigid demand for accurate work and fast cutting. Send for illustrated folder giving full details.

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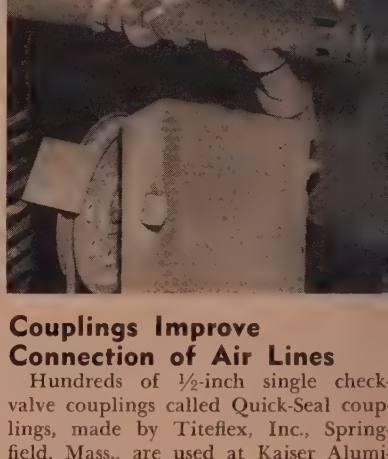

## Couplings Improve Connection of Air Lines

Hundreds of ½-inch single check-valve couplings called Quick-Seal couplings, made by Titeflex, Inc., Springfield, Mass., are used at Kaiser Aluminum & Chemical Corp's Chalmette, La. works.

Attached to air lines at the top of the electrolytic aluminum reduction cells, they simplify hooking up of portable air hoses which are moved from cell to cell during the carbon pasting operation. They can be connected and disconnected instantly without the use of tools.

The top of the Soderberg anode is cleaned twice — once before the alumi-

um liner is put in the pot, and again efore the addition of carbon paste. esides their value as time savers, Tite-ex quick-connect and disconnect coup-ngs prevent safety hazards often ex-erienced around loose hoses.

## New Tap Produces Smooth, Accurate Threads

A new tap featuring a 52° spiral pro-ides high shear at the cutting point nd uninterrupted chip ejection. This eature, coupled with the 10° - 12° face ook and 2 to 2½ thread chamfer, pro-uces extremely smooth, accurate threads n even the most difficult to machine ma-erials, according to the DoALL Co., Des laines, Ill., manufacturer.

The free cutting action and positive ontrol of chip flow makes these new Hy-Spiral taps especially suited to both luminum and zinc die casting which are raditionally difficult to tap blind in the ertical position, DoALL said.

Stringy and high temperature alloys uch as stainless steels, boron steels, Mo-el, Hastelloy B, Inconel X and ductile teels as annealed SAE-1018, C-1117, etc., re tapped to close tolerance with un-recedented gains in tool life.

## Magnesium Tote Bins Added to Line

Tote System Inc., Beatrice, Neb., man-ufacturers of bulk material handling quipment, have added magnesium Tote Bins as standard items in the Tote quipment line. Formerly, Tote Bins rabricated of magnesium were consid-red special orders.

Despite the availability of four dif-erent materials of construction, how-ver—aluminum, carbon steel, stainless teel and now magnesium—Tote sales how that more than 90% of all Tote Bins in use today are fabricated of luminum.

The magnesium containers are readi-y available in five sizes—42, 74, 90, 98 nd 110 cubic foot capacities. The 74-ubic-foot Tote Bin is the most popular ulk container, the firm reports.

CONCEALED LUBRICATED
HINGES ARE BUILT INTO YOUR DESIGN

The STREAMLINER is designed to perfectly blend into the Z-rail, giving it a concealed effect. The hinge is still mounted in a conventional manner. Fabricating problems are cut to a minimum since there are no springs, washers or pins to assemble . . . the Streamliner comes complete, ready for mounting. Free of patent infringements.

LAKE PARK
METAL STAMPING, INC.
1220 Velma Court
YOUNGSTOWN, OHIO

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THE BEST THING IN A JAMB IS AN **LP** HINGE

**OPPORTUNITY FOR SALESMAN**

in impacted metals field. Young, growing company needs salesman experienced in metal trade, particularly in aluminum and zinc impacted metals. Attractive proposition to the right man. Reply to:

**Box 522**

**MODERN METALS**
435 N. Michigan Ave.
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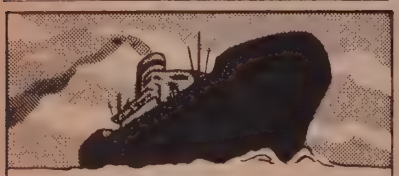

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SHEETS 36" X 96" - 1100-H14

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| 018 — .395 lb. | 032 — .380 lb. |
| 020 — .390 lb. | 040 — .375 lb. |
| 025 — .385 lb. | 050 — .371 lb. |

F.O.B. N.Y.C.

5,000 lbs. minimum; any thickness

*similar bargains in —*

COILS • RODS • STRIPS
WIRE • CIRCLES

*All* ALLOYS - GAUGES
WIDTHS - DIAMETERS
SIZES - TEMPERS!

SEND INQUIRIES TODAY

**BOX NO. 555** Modern Metals, Tribune Tower, Chicago 11, Ill.

Lots of new business from light metals fabricators and manufacturers is obtained through quarter-column advertisements like this.

And the cost is sure low — only $40 per insertion on an annual basis.

Want details? Write me.

**Dick Pulliam**
**MODERN METALS**
Tribune Tower
Chicago 11

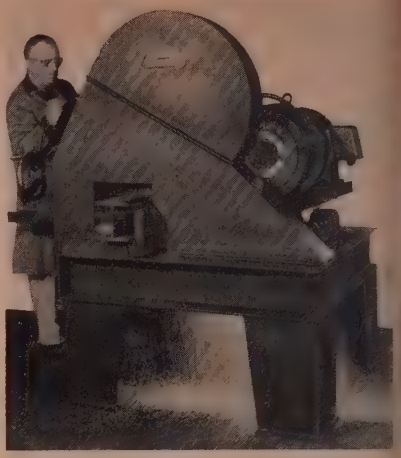
## Powerful Chop-Saw for Friction or Abrasive Cutting

Development of a radically new all-purpose chop- or swing-type, high-speed metal saw has been announced by Ty-Sa-Man Machine Co., Knoxville, Tenn.

The new saw offers powerful 30 h.p. friction or abrasive cutting and can be used with a grinding wheel. It has a wide application in the aircraft and missiles field for both production and maintenance work — designed to produce clean, high-speed cuts of high temperature alloys, bar stock, test sections, forging blanks, extrusion blanks, die blanks, heavy cable, pipe, heavy steel structural members, and many other materials.

Priced to sell at less than $3,000, the new saw offers many features not found in more expensive machines: more powerful main motor (30 h.p.), sealed-bearing spindle, timing belt drive, and a new dynamic suspension system that permits light fingertip feed without springs, counterweights or adjustments.

The machine also provides straight feed or oscillating feed at the option of the operator. When the oscillating button is pressed, the blade moves forward and backward, in and out of the cut, in line with the cutting plane. This reduces the arc of contact of the blade, increases blade life, increases the speed



of cutting, and makes for cleaner, generally burr-free abrasive sawing, either wet or dry. Oscillating speed is variable.

A heavy, one-piece shrouded blade-guard contains sparks, water spray, or metal chips and greatly reduces the operator "fear element." Spindle and guard provide up to 30-in. blade capacity. Screw-operated double vise is quickly adjustable to handle up to 8 x 8-in. sections or solids. An air-operated vise and conveyor-type roller table are available as optional extras.

## Stick-Type Extrusion Lubricant is Clean, Easy to Apply

A new type of extrusion lubricant that comes in stick form and is applied to the billet rather than the extrusion die has been developed by Imm Products Co., 3408 Monroe St., Lansing, Ill. Named Mighty Imp, the lubricant has been used "with highly satisfactory results," in several extrusion plants.

"We think this is just the lubricant that extruders have been waiting for," declares Howard Imm, owner of the new company. "It's easy to apply. You don't need any expensive spray equipment. It's clean and non-toxic, and there's nothing to mix and no waste."

"Just think of how the extruder saves in the original cost of spray equipment," Imm explains. "He also eliminates the expense of equipment maintenance."

Imm also points out that with his Mighty Imp, there is no thermal shock on the die, as in the case of sprayed on lubricants, and that there is no spray to settle on the runout table, on the press tie-rods, and on other expensive equipment around the press.

"With this one-pound stick, lubrication is no longer the costly, messy, and even dangerous operation it has been in most extrusion shops," he enthuses. "The people who have been using it say they need only two sticks per shift, running 360 billets. And they are very satisfied with its performance. They say it's very effective in reducing buildup on the die. All you do is apply it to the face of each billet—simple as that."

To further simplify application of the lubricant, Imm is designing an applicator that will make it easier for the operator to reach the billet.

Mighty Imp is priced at a dollar per stick. Imm is presently working out a quantity discount schedule for quantities over 100. He is also working on other cost saving products for the aluminum extrusion industry.

One is a saw lubricant that will be safer and easier to apply than present lubricants, and won't stain the shapes as soap stick does.

Also on Imm's "drawing board" is a new spacer tape for use in stacking extrusions when they are placed in the ageing oven. Secret of this tape is an adhesive that will withstand 2000°F without burning or breaking down. Result: The asbestos tape doesn't come unstuck. As Imm points out, that saves a lot of manhours in the heat treating department.

# Financial Briefs

### ) in Sees Improved ) met Cost Picture

ctual cost of Ormet aluminum during first quarter of 1959 (including spe- l amortization and depreciation to er debt retirement) was below the rrent market price of pig, Olin- athieson stockholders were told last nth. With the elimination of high- t purchased power and with other reased efficiencies, further lowering production costs can be expected.

Overall first quarter business of Olin athieson produced net sales and oper- ng revenues of $159,909,000, com- red with $127,625,000 in the first three nths of '58. Net profits totaled $6,- 5,000 or 48c a share, compared with net of $4,473,000, or 33c a share in same period in '58.

### uminium Ltd. Reports Lower nnage Sales, and Earnings

First quarter net income of Alumini- n Ltd. fell to $2.3 million from $5.3 illion in the first quarter of '59, ac- rding to Nathanael V. Davis, presi- nt. This is about seven cents a share, wn from 18 cents the previous year. First quarter results reflect the "sharp op in sales to producers," though ere have been continuing increases sales to fabricators and nonproducers primary aluminum, Davis said. The mpany is pushing efforts to aid fabrica- rs in developing markets. Emphasis also being placed on developing Alu- inium's own fabricating facilities in ndeveloped aluminum markets, for xample West Africa.

Aluminum Co. of Canada, subsidiary, as laid off 300 at two smelters to re- uce output 5% and bring it "more osely in line with sales." Last Decem- er Alcan announced it would trim roduction 10% to 500,000 tons yearly.

### aiser First Quarter arnings Down

First quarter net of Kaiser Aluminum Chemical Corp. were $3,476,000, com- ared with $6,419,000 for the same pe- iod last year. On a per share basis, arnings amounted to 17 cents per com- on share after preferred dividends, ased on 14,706,514 shares outstanding, ompared with 37 cents in 1958 on 14,- 02,034 shares.

Net sales for the first quarter were 91,692,000, compared with '58 first uarter sales of $99,801,000. The '58 fig- re included shipments under Govern- ent supply contracts amounting to 26,973,000 or 27% of the total. Pro- luction called for by these contracts vas completed during the fourth quar- er of 1958.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## LIGHT METALS INDUSTRY

The ten industry groups and 71 product categories listed at the right IS the Light Metals Industry. This listing, plus the number of plants shown in the right-hand column, was compiled from the circulation files of Modern Metals. All of these plants get Modern Metals regularly and top-level men in those plants read it for the type of what's-ahead light metals information you'll find in this issue.

**OVER 2 MILLION TONS . . .**

. . . of aluminum, magnesium and titanium will be consumed by these metal processing and product manufacturing plants in 1959. Here's where the metal will go:

| INDUSTRY | TONS |
|---|---|
| Building | 500,000 |
| Transportation | 420,000 |
| Consumer Durables | 300,000 |
| Machinery & Equipment | 200,000 |
| Electrical & Communication | 180,000 |
| Packaging | 100,000 |
| Processors | 100,000 |
| Scientific & Technical | 70,000 |
| Ordnance & Military | 40,000 |
| Miscellaneous Manufacturing | 90,000 |

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| INDUSTRY AND PRODUCT | NO. OF PLANTS |
|---|---|
| **BUILDING INDUSTRY** | **6950** |
| Awnings, blinds, louvers, canopies | 597 |
| Roofing, siding, shingles, etc. | 120 |
| Air conditioning, heating, ventilating | 646 |
| Fabricators, architectural & ornamental | 2058 |
| Fabricators, sheet metal | 1130 |
| Prefabricated buildings, mobile homes | 241 |
| Windows, doors, curtain walls, storefronts | 1501 |
| Hardware, weatherstrip, insul., fittings | 657 |
| **CONSUMER DURABLE GOODS** | **1981** |
| Appliances, small: Irons, mixers, etc. | 160 |
| Furniture: Outdoor, office, household | 548 |
| Houseware, giftware, gadgets | 285 |
| Lawn mowers, tillers, rakes, fencing | 209 |
| Refrig., freezers, washers, ranges, etc. | 427 |
| Toys & sporting goods | 272 |
| Utensils, all types | 80 |
| **CONTAINERS & PACKAGING** | **598** |
| Caps, closures, collapsible tubes | 77 |
| Foil converters: Cosmetic, food, beverage | 79 |
| Containers, all types | 236 |
| Shipping & luggage | 26 |
| Spools & reels | 22 |
| Drums, barrels, receptacles | 40 |
| Tanks, all types | 83 |
| Containers, household | 35 |
| **ELECTRICAL INDUSTRY** | **2019** |
| Communications: Radio, TV, phone | 469 |
| Electronics: Equipment & parts | 570 |
| Electrical equipment, heavy | 106 |
| Electrical equipment, light | 87 |
| Fixtures & fittings, incl. lighting | 429 |
| Motors, heavy & light | 160 |
| Wire & cable | 198 |
| **MACH. & EQUIP. (NON-ELECT.)** | **2634** |
| Industrial, general purpose | 515 |
| Engines | 181 |
| Mining & construction | 80 |
| Compressors, pumps, blowers, valves | 449 |
| Agricultural & dairy | 388 |
| Ladders & scaffolds | 137 |
| Materials handling | 350 |
| Office & store | 224 |
| Tools, portable & hand | 310 |
| **SCIENTIFIC & TECHNICAL EQUIP.** | **954** |
| Measuring & controlling | 286 |
| Aircraft, navigation, vehicle | 241 |
| Laboratory & professional | 123 |
| Safety equipment | 94 |
| Orthopedic & medical appliances | 90 |
| Photographic & optical | 120 |
| **TRANSPORTATION & PARTS** | **1920** |
| Aircraft, military & commercial | 458 |
| Hardware, aircraft & vehicle | 118 |
| Highway signs, bridge rails, light poles | 44 |
| Automobiles, buses, trucks | 658 |
| Trailers & truck trailers | 294 |
| Marine: Ships, boats, etc. | 208 |
| Railroad | 71 |
| Bicycles, scooters, carts, etc. | 69 |
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| **LIGHT METALS PROCESSORS** | **7014** |
| Die casting plants | 1050 |
| Foundries, sand & permanent mold | 2137 |
| Extruders & tube producers | 247 |
| Fabricators: Draw., form., stamp'g | 2394 |
| Finishers: Anodizing, plating, etc. | 293 |
| Forging, impact extruding plants | 78 |
| Fastener mfrs.: Screw machine shops | 668 |
| Reduction plants & smelters | 97 |
| Sheet, plate, foil mills | 50 |
| **MISCELLANEOUS INDUSTRIES** | **1137** |
| Chemical & metallurgical | 127 |
| Manufacturing, special & misc. | 446 |
| Signs, nameplates, displays, frames | 320 |
| Metal specialty manufacturers | 244 |
| U.S. TOTAL | 25,339 |

## High-Speed Billet Caster Chills Metal Rapidly

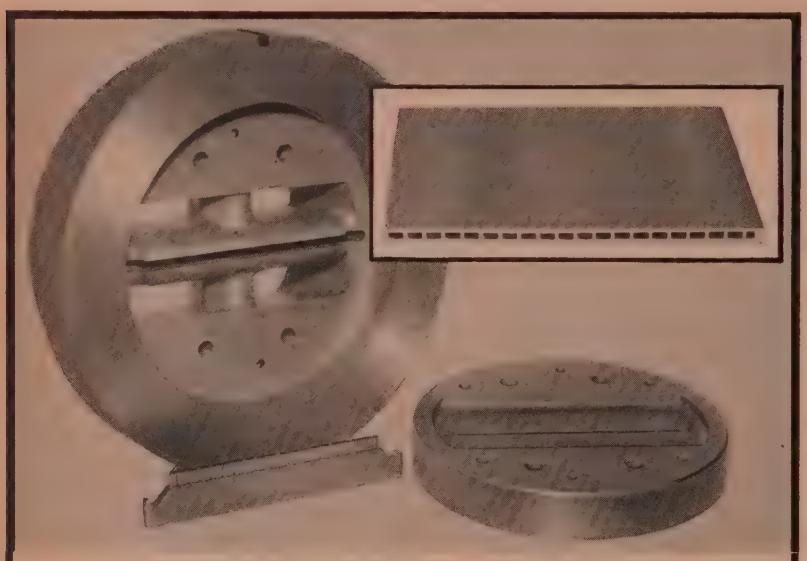
New casting techniques employing semi-continuous, hydraulically operated equipment in the production of extrusion billets, wire bars and rolling mill slabs of heavy nonferrous metals and alloys have been announced by Lobeck Casting Processes Inc., 114 E. 32nd St., New York 16.

Liquid metal flows from the induction furnace spout (see photo), along a launder to a distributor which insures splash free entry of metal into the molds. The metal is cooled rapidly in passing through the water-jacketed "bottomless" molds and solidifies by the time it leaves them. Molds are continuously filled with molten metal to match the withdrawal of the solidified castings until the billets have been cast to their desired length.

The casting machines have produced multiple-strand extrusion billets up to 10 in. diameter and rolling mill slabs up to 6 in. x 24 in., in lengths up to 20 ft. Each station has its own hydraulic power unit which allows the speed of casting and the length of stroke of the hydraulic ram to be carefully controlled. Only one operator is required per machine, with a helper assisting at the start of casting and at the final removal of the billets or slabs by overhead crane.

"Steady casting conditions of the new method give uniform, dense ingot structure from end to end, and smooth metal pouring eliminates turbulence and entrapped oxides, dross and gases," a Lobeck representative said. Rapid cooling produces a fine grain structure even in large cross sections, he added and predominantly longitudinal solidification prevents piping and internal stresses.

Lobeck installations have produced special alloys such as aluminum bronzes in addition to common nonferrous alloys.

**extrusion dies by mardis!**

Shown above: Original MARDIS-designed, liquid passage, 20-mandrel dies used to extrude the 10¼" extrusion (see inset) from a 9" billet! All MARDIS dies are expertly machined to exceptionally close tolerances. Let MARDIS solve **your** next extrusion problem.

**mardis tool & die co., inc.**

P. O. Box 134 — Mechanicsburg, Penna. Phone: POplar 6-7637


## Spanish Mill Raises Capacity

The installation of an aluminum sheet mill in Spain has been completed by an associate company of Aluminium Ltd. of Canada, Aluminio Iberico, S. A., at Alicante in southern Spain. Installation of a cold strip mill followed completion of a hot mill in November, bringing the plant's annual capacity to 18,700 tons of semi-fabricated aluminum products, including 13,000 tons of sheet products.

Construction started in 1954. The $10 million plant has both Spanish and Canadian financing, the Aluminium Ltd. equity participation being about 32%.

The cable mill came into production in 1956. Its current capacity is 4,400 tons per year. An extrusion press has 1,300 ton capacity and installation of a second press will increase extrusion capacity to 3,700 tons by next year.

Per capita consumption of aluminum in Spain is only two lbs. per person a year, one of the lowest in the world; but the market is responding to the new availability of semi-fabricated products. About three-fourths of Aluminio Iberico's production will be marketed in Spain.

The Alicante plant employs 400 workers; operations are under the direction of general manager, Alfons Zullig, who was formerly managing director of

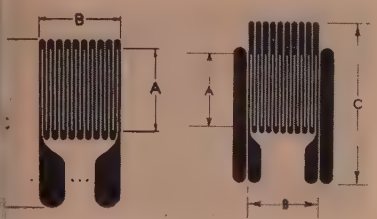
luminium Co. of South Africa Ltd., subsidiary of Aluminium Limited.

## ine of "Heavy-End" ipe Expanded

Thick-jointed aluminum pipe, called eynolds H-E Pipe, is now being made a complete range of Schedule 40 quivalent sizes in addition to Schedule 0 equivalent sizes obtainable when the roduct was introduced last December, eynolds Metals Co. reports.

"The new sizes are being produced n response to requests from oil, chem- al and processing firms who wish to xtend the cost-saving features of Rey- olds H-E Pipe to their operations," aid L. S. Beeler, manager of Reynolds hemical and petroleum markets.

Walls of the pipe are tapered in thick- ess to provide extra strength at the oints while eliminating excess metal in he pipe body. The pipe is produced in 0- and 40-ft. lengths, and can be used nterchangeably with standard alumi- um pipe.




## train Gages Designed For Magnesium

A new line of strain gages, especially leveloped for use on magnesium parts, as been developed by Tatnall Meas- ring Systems Co., Box 245, Phoenix- ille, Pa.

Main applications of the C15 gages re in the airframe and guided missile anufacturing industry. They may be sed to stress analyze fuselages, wing omponents, stablizing fins and missile odies.

"C15 gages are processed to provide n extremely low coefficient of resistance —or apparent strain—when mounted on uch material as magnesium which has thermal expansion coefficient of about 15 parts per million per degree Fahren- heit," the manufacturer said.

C15 gages are produced in two classes: 101 series (left drawing) epoxy-black type for use at temperatures from sub- zero to about 200°F; and 100 series (right) "strippable" type gages for use at temperatures to 500°F. Apparent strain of the 100 series gages is very low to 350°F, then it begins to increase.

The gages are shipped with a curve showing the apparent strain of that particular lot when mounted on a spe- cific magnesium alloy. The high temper- ature 100 series will, in addition, be supplied with data showing the varia- tion of gage factor with temperature.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# Looking Ahead

**The aluminum business is almost** booming again. While it is true there is a certain amount of buying in anticipation of steel and aluminum strikes, there is also real basic buying of most raw aluminum products. Sheet orders are at the highest level in two years. Much the same can be said of extrusions, and the aluminum foundry and die casting business (see front cover) is rebounding sharply from its past 18 months' slump. Foil shipments are at an all time high.

**Demand has been so strong** in recent weeks that all three major aluminum producers have stepped up primary production. Reynolds increased its annual output by 30,000 tons, Alcoa by 40,000 tons, and Kaiser recently added a potline at its Ravenswood mill. Producers' bookings for June are around 120% over a year ago, and orders are still creeping up. July will probably be as good or better, unless there is a strike. Both Anaconda and the Olin-Revere operations have likewise stepped up, and Harvey Aluminum reports that it is selling all of the metal it is making in its new smelter.

**Smelters are busier than they** have been in two years, which reflects good foundry business. However, aluminum scrap is hard to find, and high grade scrap sells for as much as 22 cents a pound. Because the building field is chewing up so much aluminum, and because the automotive molten metal deals are starting to roll, scrap may be at a premium for years to come.

**Will there be an aluminum strike?** Consensus around Pittsburgh as we go to press is that there is a better than even chance of the steel industry settling with the unions before deadline. If this is so, the possibility of an aluminum strike is fairly remote. But if steel goes out next month, aluminum will probably do likewise.

**Aluminum producers earnings,** which were anything but good during the past two quarters, will increase sharply this quarter—and probably the third quarter, as well. Alcoa anticipates a good fourth quarter, also, and looks to next year as being much better than 1959. (For a complete look at Alcoa's operations, see our June issue which will feature a major article on Alcoa.)

**Other signs of increased business:** Residential aluminum products continue to show a strong upward trend. Aluminum conduit, selling at a newly lowered price, is moving so fast that delivery has moved into August. Irrigation tube sales are better than in two years, reflecting better farm prosperity. Sales of aluminum—particularly wire—for refrigerators continues to exceed any prior year. There has been a great increase in the use of aluminum among cooking utensil firms, despite inroads by stainless and copper. Outdoor furniture firms are buying more aluminum than ever before.

**All auto firms are planning** V-8 engine blocks and cylinder heads for 1961 models, and big three are all testing aluminum engines. One firm plans to test a rear axle differential carrier assembly. If it catches on, it could mean 25 pounds per car. Another auto firm has moved from brass to aluminum for a master cylinder impact machine part. Betting right now is that over 80 pounds of aluminum per car will be used on 1960 models.

**Can companies continue** to cut prices in an effort to keep their customers from putting in their own can lines. But the price cuts also reflect their buying of thinner gauge tinplate (about 25%) than ever before. Meanwhile, one major can firm gets delivery of three million pounds of aluminum sheet next month; is negotiating for an added four million pounds for the fall. A competitor has bought two million pounds for June delivery and has bids out for much more sheet for its needs this fall.

**St. Lawrence Seaway** is already bringing in aluminum at cut rate prices from abroad. A cooking utensil outfit is buying pig at about two cents under market price, and sheet at four cents under domestic prices. One extruder is quoting under the market prices because, it says, it gets foreign pig at one to two cents under the market. A secondary smelter has offered 1000 tons of foreign aluminum pig at 21 cents a pound, plus duty. It is probably moving fast these days.

**Titanium mill products** are in greater demand than at any time in the past two years. March shipments totaled 644,000 pounds vs. 477,000 for February, and the upturn is continuing. Total shipments for the first three months are 20% over the 1958 level. Biggest increase is for sheet, plate and strip. Ingot production has also been stepped up. Total for March was 1.3 million pounds. Maybe titanium is off to a good start.

**Sales of aluminum building products** this year may well set a new record, according to Edward Manix, vice president of Nichols Wire & Aluminum Co. Sales jumped 20% in the first quarter, with March volume showing the sharpest rise, Manix added. He attributes the increase to "deeper penetration" of the building industry by aluminum. "Housing starts are not sufficiently higher to account for our industry's increased sales," Manix explained. "There is simply more aluminum being used per house." Stiff competition pushed prices down last year, according to Manix, "and most of us feel the lower prices are essential to keep sales rising."

***—The Editors***

# FRASSE ALUMINUM

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Ballistic missile success hinges on intelligence obtained in test firings. Tracking data – reporting velocity, direction, altitude, temperature, etc. is vital – when processed, it guides critical design changes.

Heart of the intricate data processing system at Cape Canaveral is a Potter Magnityper – a high speed electronic printer that decodes raw material . . . then stores, collates, interprets and prints at 72 *thousand* characters per minute. Lightweight, non-magnetic aluminum is essential to its efficient operation – that's why the Magnityper is made almost completely of Frasse aluminum.

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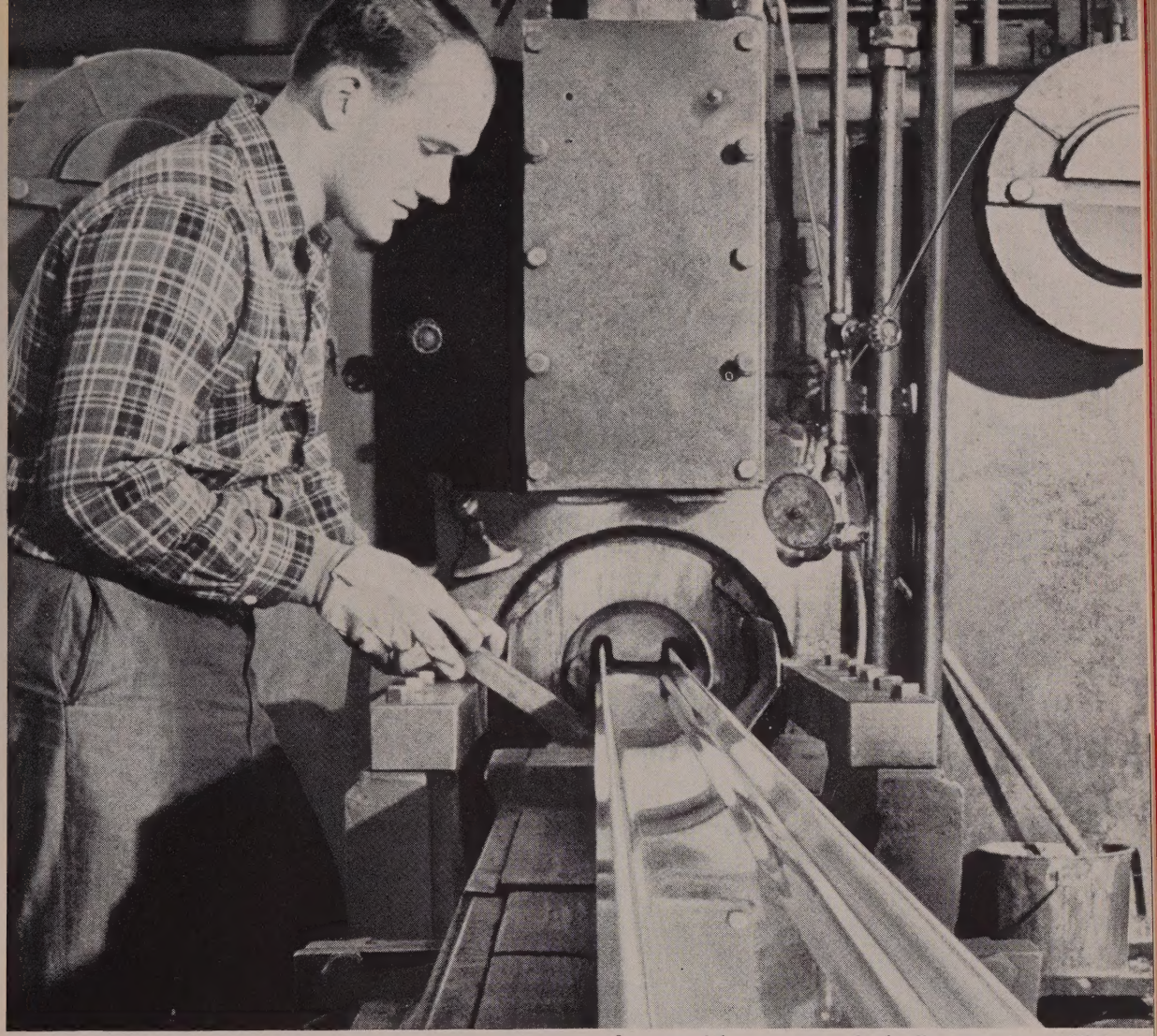

An improved version of the magnesium silicide alloys, new ALCAN B51S is substantially more economical to extrude than AA-6061.

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# A new kind of extrusion alloy

**lew ALCAN B51S aluminum alloy... xtrudes more economically than its lloy equivalents... offers important ew market opportunities for your xtruded products.**

Newest of Aluminium Limited's esearch developments, ALCAN B51S ffers many advantages to aluminum xtruders now working with AA-6061 ALCAN 65S).

The immediate advantages of this ew alloy are realized in the shop—n economy of extrusion and in the uality of the as-extruded finish. For ALCAN B51S extrudes substantially faster than AA-6061 (ALCAN 65S) with less pick-up and fewer die lines. Both advantages are particularly evident in porthole extrusions.

To the independent fabricator, the new alloy also offers increased market opportunities. Its greater strength will be valuable in many areas of aluminum application: including railings, decking, lighting standards and brackets; electrical substations and structural members of road vehicles—each and every one a new mass-tonnage opportunity for the aluminum fabricator.

For technical information on new ALCAN B51S, or for specific assistance on any ingot problem, call or write the nearest office of Aluminium Limited Sales, Inc.

**Aluminium Limited**

*Ingot Specialist*...serving American Aluminum Fabricators—

In the U.S. — Aluminium Limited Sales, Inc.
630 Fifth Avenue, New York 20, N.Y.
Cleveland • Chicago • Los Angeles • Detroit • Atlanta

Additional distribution (Alcan Foundry Alloys):
**Apex Smelting Co.**, Chicago, Cleveland, Los Angeles
**Charles Batchelder Company, Inc.**, Botsford, Conn.

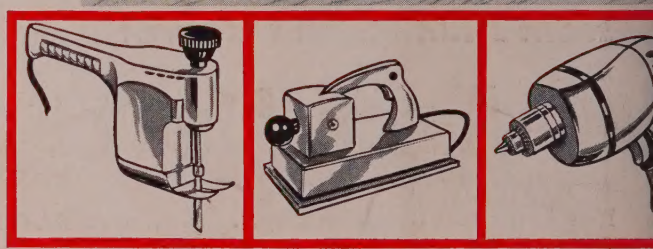
FOR A BETTER JOB IN LESS TIME...

# he's using power tools made with aluminum

Today's homeowner is handier than ever and the professional works faster, delivers a better job—thanks to power tools and the versatility of aluminum. Whether you're sawing, sanding or drilling, these specialized tools provide the modern, easy way to finish the task.

Lightweight aluminum helps make power tools more portable, easier to handle. They give better service and last longer because aluminum is stronger. It's the one metal that resists rust, corrosion, pitting and chipping, always stays new looking. Too, manufacturers prefer aluminum because it can be formed in many ways, is easy to machine, and saves costly production steps.

Apex Smelting Company and its metallurgists work closely with the foundries and die casters who serve the power tool industry. Custom and standard aluminum alloys, scientifically produced by Apex to rigid specifications, are providing the performance and quality you want in these modern day work-savers.



*Research leadership back of every ingot*

**APEX SMELTING COMPANY**

Producers of ALUMINUM, MAGNESIUM AND ZINC ALLOYS

CHICAGO 12 CLEVELAND 5 LONG BEACH 10, CAL.
SPRINGFIELD, OREGON (National Metallurgical Corp.)

**Your products** may also be produced better and more efficiently with the help of aluminum castings. Apex Smelting and the companies it serves in the die casting and foundry industry stand ready to assist you and your engineers.